X

WORKING PLAN

OF THE

RANIKHET WORKING CIRCLE.

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ALLAHABAD

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INTRODUCTION.

THE field work in connection with this working plan was accomplished in nine weeks at the close of 1881 by myself, assisted by Mr. A. F. Broun, Assistant Conservator of Forests. In June, 1885, I again visited the Reserved Forest.

Owing to press of other work the data then collected could not be worked up thoroughly until last April, when I was placed on special duty to complete the working plans of the Naini Tál and Ránikhet forests. Most of the computations had to be done over again, as trees had in the meantime been felled in nearly every one of the numerous compartments into which the forests had been divided. These computations occupied two weeks in April, and the whole of the report and working plan was written between 6th May and 5th June.

The report also embodies the results of enumeration surveys and measurements of trees made in 1878-79 by Mr. W. R. J. Brereton, Deputy Conservator of Forests, who drew up a preliminary working plan for the reserved forest in 1880, which plan was, however, considered premature by the Inspector-General of Forests and never came into operation.

The present plan was submitted for approval to the Conservator in the third week of June and was discussed by Messrs. Greig and Bagshawe and the divisional officer, Mr. J. M. Braidwood. These officers agreed to the proposals without alteration or addition.

CAMP DEHRA DUN :
The 1st December, 1886.

E. E. FERNANDEZ,
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WORKING PLAN

OF THE

RANIKHET WORKING CIRCLE.

PART I.

GENERAL ACCOUNT OF THE FORESTS.

THIS account will be given in three separate chapters. Chapter I will specify all important facts concerning the administration of these forests, while in Chapter II will be described all facts influencing production and in Chapter III those bearing on their economic condition.

CHAPTER I.—FACTS REGARDING THEIR ADMINISTRATION.

SECTION I.—SITUATION, AREA, AND BOUNDARIES.

The forests for which the present working plan has been drawn up are all situated within a radius of eight miles, as the crow flies, round the military station of Ránikhet. With the exception of Machhor and Bhatronj, which are too far from the station to serve as convenient sources for the supply of fuel to the garrison, and of Bellek and Siahi Devi, the resources of which very limited areas are mostly required for other purposes, they comprise all the forests of the Ránikhet sub-division of the Naini Tál Forest Division.

Thus the forests included in the working plan are the following:—

		Area. Acres.
1.	The Ránikhet reserve	4,951
2.	„ Sauni protected forest	4,425
3.	„ Siún ditto	727
4.	„ Kathálok	1,813
5.	„ Ganiádeoli	909
6.	„ Chiliánáo	612
7.	„ Kárchuli	816
8.	„ Padholi	944
9.	„ Dwársaun	1,514
10.	„ Chaubattia, East	869
11.	Ditto, West (known also as Tára Udiár)	335
	Total ...	17,315

These forests, forming eight detached blocks, are situated within a tract of country about 14½ miles long by nearly 7 broad, and extending between 29°-34′-48″ and 29°-40′-52″ north latitude and 79°-20′-40″ and 79°-34′-54″ east longitude. They spread over the following *pattis* of the Kumáun district in the Kumáun Commissionership:—Malla Kaklason, Malla and Talla Silor, Chauthán, Malli Doti, Uttáguli Walla and Palla, Chaugáon, Malla Tikhun, Riuni, and Dwársaun. All these pattis belong to the Almora tahsíl.

The shape of the boundaries is very defective, arbitrary curves between two consecutive pillars being very common. The consequence is that at many points it is extremely difficult, at some quite impossible, to follow the boundary, and encroachments might pass unnoticed for years. In the reserve this drawback has been overcome by a ring fence, the original object of which, however, was to prevent cattle and human trespass. The fence is a live one of hawthorn wherever the soil is favourable, and a dead one of rough posts and rails or of wire on wooden standards elsewhere. There can be no question that something must be done as soon as possible to render the

boundary easily and permanently recognisable; otherwise harassing disputes in a near future are inevitable.

With the exception of the cantonment lands, the boundary of which marches, for a shorter or longer distance, with those of the Ránikhet reserve and the Padholi, Chiliánáo, Ganiádeoli, and Chaubattia forests, the adjoining estates consist of village lands, the cultivation of which not infrequently comes right up to the boundary.

SECTION II.—HISTORY OF SELECTION AND LEGAL POSITION OF THE FORESTS.

The Ránikhet reserve, declared as such by *Government Gazette* Notification No. 176, dated 26th February, 1879, is absolutely free of all rights and privileges. Already in 1871, when it first came under the control of the Forest Department, it had been excluded from the areas from which villagers could requisition for trees, nevertheless free grants of trees from it continued to be made to villagers up to 1876-77.

It is a fact worthy of record that when the various forests were taken up by the Department, the principle was affirmed and observed that villagers were to be compensated only for land that they actually had under *regular* cultivation. Even potato fields were brought within the forest area without payment of compensation. The obvious conclusion from these facts is that the compensation given was not for the land and the forest growth on it, but only for the improvements made on the land.

With regard to the remaining forests, which are *protected* forests under the Forest Act, their demarcation, preliminary to their transfer to the Forest Department, was ordered by Government in 1871, in Public Works Department Resolution No. 269 $\frac{F}{C}$ dated 26th August, 1871.

The principles laid down in that Resolution for the guidance of the officers deputed on this work will be gathered from the following excerpt:—

"3. The principle to be observed is that each forest shall be surrounded by a ring-fence. No considerable tracts of open land which may not be necessary for the security of the forest, or for purposes of planting, should be included within the boundaries. A proper range of jungle should be set aside for the wants of villages in respect of grazing, fuel, and timber. If this end cannot be otherwise attained, portions of the less valuable forest will be marked as second-class forests, where grazing may be allowed, fuel taken, and timber, under permission, cut for domestic use. If in the case of any village such arrangement cannot be made, compensation for the appropriation of the jungle necessary to the continuance of the village must be given. If any cultivated lands are taken up within a forest, compensation must also be given. These proceedings are to be guided by prescriptive use and recognised rights.

"4. Following those principles, Major Fisher and Lieutenant Campbell are then to demarcate clearly on their survey maps the portions of tracts left absolutely excluded from forest control.

"5. The same officers to demarcate on their maps portions of tracts left under forest control, but in which rights of villages to pasturage and fuel exist conditionally.

"6. The same officers to draw up a set of rules under which pasturage rights and the cutting of timber may be allowed to villages by the Forest Department.

"7. Any difference of opinion between the above officers to be disposed of by the Commissioner in conjunction with the Conservator of Forests."

From the above extract it will be seen that Government contemplated the formation of three classes of forest:—the first to be enclosed with a ring-fence and relieved of all exercise of rights and privileges; the second to be also under the Forest Department, but to be open conditionally to pasturage, and *to be constituted only in*

case a sufficient area of forest of the next class could not be formed in any particular case; and the third to consist of a proper "range of *jungle*" to be set aside for the wants of villages in respect of grazing, fuel, and timber.

Unfortunately these provisions, which, if duly carried out, would have at once given us several large areas of excellent reserved forest and saved much present and subsequent trouble and confusion, did not all recommend themselves to the officers deputed, and only forests of the second class were exclusively formed. And even this did not, owing to sundry delays, take place until the end of 1873; so that, in order to save the forests in the meanwhile, Government, on 24th July, 1871, issued a Notification (No. 110$\frac{F}{C}$) which declared that, "under section 2 of Act VII of 1865, all the land lying within a radius of 12 miles from the Kampur (Ránikhet) hill is placed under the provisions of that Act."

In accordance with the Government Resolution already quoted, the following set of rules was drawn up, regulating the pasturage of the village cattle and the removal by the villagers of forest produce:—

"I.—Villagers have the right of grazing their cattle as heretofore, except in portions which may be fenced off for plantations, &c., notice of the establishment of such nurseries, plantations, &c., to be sent to the Senior Assistant Commissioner.

"II.—Villagers have the right as heretofore to collect dry leaves, cut grass, remove fallen wood, cut thorns, brambles, &c., for fencing or erecting cattle-sheds and huts, quarry stones or slates and use water; also to cut oak leaves where none have been left to them outside the forest limits for their own use, but not for sale.

"III.—All villagers are entitled to green timber for building, wood for ploughs or other domestic purposes, free of cost for their own use and not for sale, on application to the forest officer.

"IV.—No new clearings shall be made by villagers within forest boundaries; existing cultivation within the forest limits has been demarcated and may not be increased.

"V.— When it is deemed advisable to allow any land within the forest limits to be used for potato cultivation, the villagers who were formerly allowed the use of the land to have the option of so cultivating it."

The meaning of rule I was later on more strictly defined by means of lists drawn up of the number of head of cattle of the various kinds allowed to be grazed free from each village. These lists are given separately for each forest in Part II.

Rules II and III have also been made more definite by the printed "List of villages which have rights in the Ránikhet Government Forests," but the quantity of produce which the villagers may remove, with or without special permission, still remains undefined as before. A transcript of this list is given for each forest separately in the proper place.

How far these so-called rights are rights in the strictly legal sense of the term it is not the province of the working plans officer to consider or argue; but bearing in mind (1) the frequent restrictions placed by mere executive order on their free exercise, (2) the evident intention of Government, in the Resolution quoted, of absolutely excluding them from certain undefined areas to be permanently fenced off, and (3) especially their absolute extinction without compensation, except in the solitary instance of lands actually under cultivation, in the area which is now the Ránikhet reserve, one is forced to the conclusion that they are mere concessions on the part of a paternal Government—concessions that may be entirely withdrawn, as they were originally granted, by a purely administrative order, although, in view of the long time during which they have been enjoyed, due consideration will always have to be accorded to the immediate convenience of the people concerned.

The protected forests were declared such under the Forest Act of 1878 in *Government Gazette* Notification No. 177, dated 26th February, 1879, but a revised notification substituting new schedules of boundaries and enclosed village lands was published on 31st January, 1883.

SECTION III.—PROTECTION.

Administrative divisions and establishments.—The following statement exhibits at one and the same time the division of the forests into ranges and beats and the distribution of the protective establishment:—

Range (under a Forester).	Forests under a single Forest guard (beat).	Area of beat.	Remarks.
		Acrs.	
Ránikhet Range, Area 12,270 acres.	Blocks I and IV, Ránikhet reserve	2,913	*These forests are not included in the working plan.
	Dwársaun	1,614	
	Ganiádeoli, Chiliánáo, and Kárchúli	1,737	
	The Chaubattias	1,204	
	Blocks II and III, Ránikhet reserve	2,038	
	Padholi	944	
	Siahi Debi*	1,920	
Sauni Range, Area 14,856 acres.	Sauni	4,425	
	Kathálekh, Siún, and Bellekh*	4,460	
	Machhor* and Bhatronj*	5,971	

Offences.—In the whole of the forests of the Ránikhet sub-division the average annual number of offences during the past five years has been 54, involving about 144 persons, convictions having been obtained in 47 cases against 119 individuals. Of these 54 cases, one was of incendiarism, 42 of unauthorized felling and appropriation, 8 of illicit pasturing, and 3 of miscellaneous offences. I have not been able to ascertain what proportion of these offences was merely compounded. The Divisional Officer is also a Special Magistrate of the second class under the Forest Act and takes up more than half the cases, the rest going up before the Cantonment Magistrate. As the forests dealt with in this working plan comprise the more important and frequented portions of the area of the sub-division, the figures just given need not be discounted to any great extent in applying them to those forests.

Fire-conservancy.—The statistics of fire-conservancy since 1875-76, when protective measures were first undertaken, are given in the following statement:—

Season	Number of acres attempted in										Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost.	
	Reserve.	Sauni.	Siún.	Kathálekh.	Ganiádeoli.	Chiliánáo.	Karchúli.	Padholi.	Chaubattia.	Entire area.					Total.	Per acre actually protected.
															Rs	Pice.
1875-76 ...	129	...	...	...	...	...	...	...	...	129	...	...	...	129	11	16·4
1876-77 ...	4,951	...	...	...	...	...	...	...	...	4,951	...	...	...	4,951	429	16 6
1877-78 ...	4,951	...	...	320	320	...	...	...	...	5,591	640	2	320	4,951	244	9 4
1878-79 ...	4,951	...	...	320	320	...	...	...	...	5,591	150	3	50	5,441	159	5·6
1879-80 ..	4,951	2,560	...	320	320	...	...	...	...	8,151	12	1	12	8,139	233	5 5
1880-81 .	4,951	2,560	...	320	320	...	...	...	..	8,151	...		...	8,151	153	3 6
1881-82 ...	4,951	2,560	...	1,700	909	...	...	944	1,210	12,274	257	6	43	12,011	470	7 5
1882-83 .	4,951	2,560	...	1,700	909	...	...	944	1,210	12,274	68	8	8	12,200	491	7 7
1883-84 ...	4,951	2,560	...	1,700	909	618	...	944	1,210	12,892	132	3	44	12,768	429	1·6
1884-85 ...	4,951	2,560	727	1,700	909	618	216	944	1,210	13,835	88	3	29	13,735	258	3·6
1885-86 ...	4,951	2,560	727	1,700	909	618	216	944	1,210	13,835	25	2	12	13,810	236	3·3
	40,639	17,920	1,454	9,780	5,825	1,854	432	4,720	6,050	98,674	1,372	28	49	95,796	3,113	6 2

The most remarkable fact that the preceding statement brings out is the extremely small average area that each fire spreads over the hilly ground and the predominance of chír in the crop notwithstanding.

CHAPTER II.—CONDITIONS OF PRODUCTION.

In this chapter will be described (1) the topography, (2) the climate, (3) the soil and subsoil, and (4) the crop and its constituents.

SECTION I.—TOPOGRAPHY.

The forests are situated in the interior of the Himálayas on comparatively low hills situated about 28 miles behind the first and much higher range on which Naini Tál is situated. Unlike the first and further ranges, these hills are characterized by rounded or flat ridges, large long spurs, and generally uniform sides. Precipices are extremely uncommon and the slopes are usually easy enough for a saddled horse to be led about almost everywhere. Owing to the dip of the strata being to north-east, the steepest slopes are on the south and west. The hills rise from 1,000 to seldom more than 1,700 feet above the deepest valleys, and the difference of level in the case of many of the valleys is often only 500 to 700 feet.

The forests, as is to be expected, occupy the upper ridges and spurs of the hills, cultivation having taken possession of the lower slopes. The main ridges form a continuous sinuous line extending from south-west to north-east, and forming the water-parting, near the sources of those rivers, between the Rámganga, as represented by one of its principal affluents, the Gaggás, on the north, and the Kosi on the south; but the greater portion of the area included in the working plan lies within the drainage basin of the latter river.

SECTION II.—CLIMATE.

As already stated in Chapter I, the forests are situated about 7° above the northern tropic, so that the longest and shortest days of the year are respectively of nearly 16 and 8 hours' duration each, and the variations of the seasons are therefore, irrespectively of the great distance from the sea, well marked.

The highest point is 6,942 feet above sea-level, and the lowest 4,352 feet, the mean elevation being about 5,300 feet. Hence falls of snow occur in winter over nearly the entire area, but the snow generally melts soon after it falls, and it is only the later falls that lie for a few weeks on protected northerly slopes and in glens above 6,600 feet with a northerly outlook. From the beginning of October to the middle of December the weather is clear and frosty, the first snowfall not ordinarily occurring till the second week in December.

The meteorological data which follow are from observations taken at the observatory at Ránikhet, situated almost in the centre of the area at an elevation of 6,068·75 feet above the sea :—

Months.	Average monthly mean pressures (average of 8-9 years).	Average mean monthly and annual shade-temperatures (average of 11-12 years).	Average excess of insolation over corresponding maximum shade-temperatures (average of 4-5 years).	Average depression of mean nocturnal temperatures below mean minimum shade-temperatures (average of 4-5 years).	Mean diurnal and annual range of shade-temperature.	Average monthly mean vapour-tension (average of 6 years).	Average monthly mean relative humidity (average of 7 years).	Average proportion of clouded sky in tenths of the expanse (average of 10-11 years).	Average monthly and annual rainfall (average of 11 years.)	*Mean resultant wind directions (average of 10 years).*		Monthly mean velocity of wind in miles per diem (average of 8-10 years).
										Percentage.	Direction.	
January ...	24·108	46·3	63·0	6·7	16·1	·183	59	3·44	1·53 11	S. 81° W.		67·4
February ...	24·088	48·7	61·5	6·2	17·0	·193	60	4·61	2·58 22	S. 54° W.		71·6
March ...	24·076	56·4	65·1	6·1	18·2	·237	55	3·78	2·02 49	S. 52° W.		92·0
April ...	24·066	65·5	62·7	7·1	18·6	·273	47	3·35	1·59 48	S. 63° W.		95·0
May ...	24·017	68·0	62·3	5·4	18·1	·343	55	3·70	3·11 45	S. 63° W.		89·4
June ...	23·942	71·1	59·5	3·3	15·0	·458	62	5·54	6·03 47	S. 65° W.		91·1
July ...	23·936	67·9	55·4	2·0	11·2	·557	85	8·56	13·38 25	S. 66° W.		119·0
August ...	23·967	67·3	59·7	2·3	10·9	·574	86	8·50	10·45 25	S. 72° W.		108·3
September ...	24·031	66·2	64·8	3·9	13·1	·516	80	5·96	6·79 38	S. 59° W.		98·4
October ...	24·114	61·2	62·2	6·7	15·3	·338	63	1·61	0·64 51	S. 58° W.		84·7
November ...	24·157	55·2	63·6	7·7	17·2	·244	58	1·22	0·20 33	S. 49° W.		71·3
December ...	24·143	49·7	61·2	6·9	16·1	·190	56	2·70	1·07 16	S. 48° W.		68·0
Year ...	24·054	60·3	61·8	5·4	15·5	·344	64	4·41	49·34 ...	...		...

Of all the stations in the North-West Himálayas Ránikhet is subject to the smallest diurnal range of temperature. Indeed, as will be seen from an inspection of the preceding table, the climate here is remarkably equable. The high ridge on which Naini Tál is situated appropriates the greater portion of the moisture of the south-west monsoon winds, and thus diminishes the rainfall on the lower ridges behind. As usual in the north-west Himálayas, there is rain during every month in the year, but October, November, and the early part of December are the driest months of the twelve. The winter rains begin in the second week of December and continue up to the end of February or beginning of March. April and the early part of May are stormy and hail is frequent. The summer rains come on at the end of June and last till the end of September, but heavy falls are rare.

In winter the exposed thermometer may frequently go down to 19°. During January and December the temperature out in the open at night seldom remains above freezing point. The highest temperatures in the sun occur in August-September, when the thermometer sometimes stands as high as 156°Fah.

The remarkable predominance of southerly winds is due, according to Mr. S. A. Hill, the Provincial Meteorological Reporter, to the fact of the winter monsoon being "of no great vertical thickness, while that of the summer months extends to a much greater elevation than the highest station at which observations have been made, When northerly or north-westerly winds are blowing on the plains, the return current from the south-west is felt on the mountains at all elevations above the first few thousand feet; and when southerly winds blow over the plains, the return current, if it exists at all, lies at a very great altitude."

Section III.—Soil and Sub-Soil.

The rocks here are all metamorphic, with an intrusion of granitic or gneissic rock, about two miles broad, running across the area from south-east to north-west. Among the metamorphic rocks mica schists are the most extensively represented, and constitute, with limited appearances of quartzite of various degrees of hardness, almost exclusively the Agástholi, Kathálekh, Siún, and Dwársaun hills, and the greater portion of the slopes in Padholi and the rolling hills in the reserve. The belt of intrusive rocks includes the southernmost portion of the reserve, the whole of the Chaubattia forests, the western extremity of Padholi, the northern third of Ganiádeoli, and the greater portion of Chiliánáo. It is granitic only in Chaubattia East, and is more usually a schistose gneiss which crumbles and decomposes easily.

The resulting soil is a fine micaceous sand which of itself is free, dry, and, except in the gneissic area, usually unfertile for agriculture, requiring heavy manuring. But under broad-leaved forest it may become fairly and even highly fertile, as in Siún, parts of Sauni, the reserve, &c., where the ground is covered with dense brushwood. In any case, however, it is an excellent soil for chír, especially where an intermixture of oak is possible. The underlying rock, being everywhere laminated or easily amenable to weather influences, constitutes a generally favourable sub-soil and often makes up, to a great extent, for the absence of soil on the steeper slopes.

Section IV.—The Stock.

The subject of this section may be most conveniently treated under the following four heads:—

1. Types of forest growth.
2. Special account of the principal constituent species.
3. Quantity of standing stock.
4. Plantations.

Article 1.—Types of forest growth.

There are three main types of forest growth as follows, beginning from the bottom:—

1., Lower broad-leaved forest.—This type has a very limited distribution, being found only below 5,000 feet of altitude. It consists chiefly of goirál (*Bauhinia*

variegata) and gadhmahua (*Engelhardtia Colebrookiana*), with a few kakkar (*Pistacia integerrima*), and, in moist depressions, phanyáth (*Quercus anulata*), kathula (*Tetranthera laurifolia*), and kaunla (*Machilus odoratissima*). A few scattered chír get mixed up with this type on the drier open slopes. On account of the very small area it covers, the type in qustion is of no practical importance.

II., Chír forest.—This type begins just above the preceding and occupies all dry open slopes up to roughly 6,400 feet on southerly and 6,200 feet on northerly aspects. It is by far the most largely distributed of the three types, occupying approximately five-sixths of the total area. The chír is not necessarily pure and is not unfrequently accompanied by a smaller or larger proportion of oak and ayár; but these species, besides being always in the minority, never form more than an open understory. The chír is usually well-grown, acquiring the largest dimensions of which it is capable in these forests. Sometimes, as on slopes of 40° and upwards, the trees are scattered, but blanks being left out of account, they generally compose a density of from 0·5 to 0·8. The blanks just referred to are mostly old cultivation terraces, which under the régime of heavy grazing and annual fires have been filling up only very gradually, or have deteriorated to such an extent that their recovery, within a reasonable period of time, as forest-bearing land can only take place under the very strictest conservancy. As regards reproduction, the proportion of saplings and low poles is on most slopes of less than 35° fairly conspicuous, especially where no large gaps in the forest exist; but they must become far more numerous than they actually are before they can be said to form a more or less complete advance growth. They are, however sufficiently numerous to justify the removal of a considerable part of the upper crop; but as this older advance growth occurs in patches, the operation in question will have to be executed with great caution and judgment, in view of the generally disproportionately small number of recent seedlings due to the heavy grazing and the annual recurrence of conflagrations until two or three years ago. The broad-leaved trees under the pines are for the most part lopped every year for fodder or manure, and are, therefore, in a bushy or pollarded condition, and can on that account affect the growth or reproduction of chír only to an insignificant extent.

Up to 1871, when the forests were placed under departmental control, and for some years later until the people were rendered amenable to the new discipline, chír forest suffered very severely. Dr. King, writing in July, says:—" All over these forests fine chír logs may be seen rotting, large trees having been originally felled to supply some small domestic demand for timber, which having been met, the remainder was left to decay. Only recently was an establishment of five patrols put on by the Forest Department for the protection of those valuable forests, and since their appointment villagers have been ordered to send requisitions (for such timber as they may require) to the Forest Officer, without whose sanction they are allowed to cut nothing. Old habits are, however, not so easily changed, and the villagers do not like the trouble of applying for what they want. The authority of the patrol establishment is frequently set at naught and trees are cut in defiance of remonstrances."

It is hardly necessary to say that the chír needles decompose very slowly, and, owing to the easy ingress of the sun's rays through the open leaf-canopy and to the intrinsic dry nature of the soil, they decompose only partially and, if fires and cattle are excluded, accumulate into a thick layer of harsh humus injurious to germinating seeds and very young plants. The admission of fire would of course be a remedy worse than the evil to be cured; but light grazing for a year or two just before a heavy crop of seedlings is expected (so that the needles may be comminuted and crushed into the soil and thus decompose more easily and completely) and the removal from the surface, for litter, of a portion of the annual fall of needles until the seedlings have taken thorough possession of the soil are practicable expedients for securing successful regeneration. But the most effective, economical, and permanent remedy would be an intimate mixture of broad-leaved trees, especially of banj, with the chír.

III., Upper broad-leaved forest.—This type extends above the chír type to the highest points of the forests and runs down the deeper and moister ravines and gullies through the latter to meet the lower broad-leaved type. It consists mainly of bánj and brons with ayár. A few individuals of the following species are found in mixture:—In moist situations utis (*Alnus nepalensis*), goria (*Carpinus viminea*), kaunla (*Machilus odoratissima*), kafál (*Myrica sapida*), gardár (*Ilex dipyrena*), saguna (*Cotoneaster acuminata*), khagshi (*Cornus macrophylla*), lodh (*Symplocos cratægoides*), dakhmila (*Rhus semialata*), bhamora (*Cornus capitata*), &c.; elsewhere mehl (*Pyrus Pashia*), guya (*Viburnum cotinifolium*), tilmolia (*V. stellulatum*), ghingaru (*Cratægus pyracantha*), chalni (*Populus ciliata*), &c. On the richer and moister patches of soil sakena (*Indigofera heterantha*) and, on a smaller scale, chamlia (*Desmodium tiliæfolium*) form a more or less dense undergrowth.

Forest of this type has greatly suffered from repeated lopping for fodder. As soon as the young flush of tender leaves is out it is mercilessly cut and, to save the ruthless destroyer a little extra exertion, large branches are lopped off, but only a portion of what is cut is eaten by the cattle, the remainder being trampled upon and wasted. Thus every individual has first to pass through a long bushy stage, only eventually to become, and for ever remain, a low miserable pollard. Under such treatment it is obvious that the production of fruit and seed is reduced to a minimum and a large proportion of what is produced is barren or weak. Few of the rare seedlings that spring up can escape being plucked up by the roots or crushed under foot by cattle as they graze along, and even these, until they are well established in the soil, are browsed down year after year. The consequence is that new seedlings are extremely rare and the slight extent of reproduction met with consists of bushes and low pollards, which are hardly one-fourth of the size they ought to be at their age and which can never grow up vigorously again unless they are entirely renewed by being cut back flush with the ground. In some places, where the soil and situation are exceptionally favourable, the trees in this type of forest, in spite of the long-continued maltreatment they have undergone, compose a density of from 0·6 to 0·8, but they are in nearly every instance stunted and low-branched.

Article 2.—The principal constituent species.

The principal species, both on account of its wide distribution, the size it attains, and the suitability of its wood both as timber and fuel, is, *par excellence*, chír. Then comes bánj by reason of its extensive distribution, the superior fuel it yields, and the use of its wood for agricultural implements. Lastly, we have brons and ayár, which are, however, important principally for the quantity in which they are and always will be available. The remaining species are too slightly represented and are of too little value, save as fuel, to require being separately described.

CHÍR (*Pinus longifolia*).

This tree is found at every elevation in these forests, although, as I said before, it is gregarious only between 5,000 and 6 400 feet on southerly exposures and from the lowest point to 6,290 feet on northerly slopes. As regards easterly and westerly aspects, the former assimilates the characteristics of southerly, the latter of northerly, aspects.

The dry, free, sandy nature of the soil is favourable for the exclusive growth of the chír and its reproduction, so that it here forms comparatively good forests; and seedlings, saplings, and low poles of it are abundant, in spite of long-continued heavy grazing and, until recent years, annually recurring fires. The instances of the Ránikhet reserve and the three small areas closed and protected from fire respectively in Ganiádeoli, Kathálekh, and Sauni have conclusively proved that in these forests less than a decade of mere protection results in a more or less complete crop of seedlings being produced. Some cones at least are produced by a majority of the trees every year, but really gregarious seeding usually occurs only every second or third year, and it is only on such occasions that the larger proportion of the seeds are fertile and produce vigorous plants.

Although in these forest chír seedlings come up and survive and even establish themselves under fairly dense cover (up to a co-efficient of 0·6 certainly), nevertheless they can make a start upwards only when they are freely uncovered. During the past four years the seedlings in the Ránikhet reserve have on the whole made no appreciable progress. Of course all self-sown seedlings out in the forest, to whatever species they belong, pass through a shorter or longer stage of more or less stationary growth above ground; but there can be no doubt that the want of progress just referred is due in a very great measure to the too dense cover overhead, although this has been insufficient to kill them. Nevertheless, the unsatisfactory growth of the young seedlings is also attributable, in a great measure, to the presence of too many large trees monopolizing all the room and sustenance in the soil, and, in areas closed to grazing and protected from fires, also to the heavy accumulation of very partially decomposed pine needles. As all three unfavourable circumstances are due to one and the same cause, *viz.*, the presence of a large number of overtopping trees, we cannot be too cautious that we do not assign too much importance to the single one of insufficient illumination.

The immediately following statement gives the results of the counting of concentric rings in chír. That species is so apt to form spurious or incomplete rings, as I have shown in a paper published in the "Indian Forester," that in a tree of moderate size the number of rings visible on one radius may differ from that on another by as many as 20 and even more. Numerous figures in support of this fact are with me, but their publication here would only have the effect of unnecessarily increasing the already great bulk of this report. To minimize the resulting error in the present case, two diameters crossing each other at right angles and being respectively the maximum and minimum diameters of the stump in question were aligned on each section, and the rings on each of the four radii were counted separately. The smallest number thus obtained was then adopted and the remaining three rejected. No doubt, even of this number some of the rings were incomplete ones—appearing only on that radius; but there was no means, except at the cost of enormous additional labour, of eliminating this error, which, however, being necessarily small, I had to be satisfied with, having got rid of the very much larger one that would have resulted from the adoption of any one of the other three radii.

Results of counting of concentric rings of wood in chír.

Running number of trees.	Number of rings counted on																	Thickness of bark in inches.
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	
	Inch of radius.																	
1	14	18	23	18	14	17	16	30	24	23	25	...	...	...	...	...	...	0·5
2	10	8	7	8	9	11	15	18	15	15	...	...	...	...	...	..	...	0·6
3	18	21	14	21	27	24	13	13	27	18	23	...	...	...	...	...	...	0·4
4	14	15	22	18	22	21	14	17	16	25	33	30	...	...	...	...	...	0·4
5	15	15	18	17	21	11	19	22	20	25	...	...	...	...	...	...	...	0·5
6	12	12	18	28	27	14	11	17	19	20	22	...	...	...	...	...	...	0·4
7	10	16	24	32	24	26	29	28	23	25	23	22	26	24	...	...	...	0·5
8	12	12	28	29	26	18	24	16	23	27	...	...	...	...	...	...	...	0·4
9	13	17	17	19	20	10	21	26	19	33	...	...	...	...	...	...	...	0·5
10	8	6	8	13	11	9	20	26	35	36	27	28	35	...	...	...	...	0·6
11	7	7	7	13	14	15	18	42	28	26	37	26	28	35	...	...	...	0·5
12	18	20	28	26	28	33	29	26	24	19	20	20	20	...	...	...	...	0·4
13	8	7	9	10	10	14	10	28	37	32	29	24	33	...	...	...	...	0·6
14	18	18	22	26	30	21	17	14	15	20	...	...	...	...	...	...	...	0·4
15	13	23	23	24	20	20	20	14	26	30	...	...	...	...	...	...	...	0·5
16	18	22	23	23	24	24	16	19	38	35	...	...	...	...	...	...	...	0·3
17	10	11	18	10	11	8	11	11	15	19	25	25	...	...	...	...	...	0·6
18	10	12	17	31	31	28	26	16	14	16	17	24	20	...	...	..	...	0·4
19	8	11	23	20	21	21	23	26	28	21	32	40	...	...	...	...	...	0·4
20	2	3	3	3	4	6	4	5	6	9	12	16	...	...	...	...	...	0·5
21	6	7	7	8	11	12	13	13	18	...	...	...	...	...	...	...	...	0·4

Result of counting of concentric rings of wood in chír—(concluded).

Running number of trees.	Number of rings counted on																	Thickness of bark in inches.
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	
	Inch of radius.																	
22	10	14	20	24	24	21	21	16	20	18	18	16	17	20	26	...	...	0·5
23	5	6	8	9	13	20	30	26	30	35	39	33	...	...	...	...	...	0·5
24	4	7	6	9	11	15	25	32	45	39	47	39	...	...	...	...	...	0·5
25	8	6	7	9	11	14	29	20	27	21	20	20	29	...	...	...	...	0·4
26	13	7	6	8	10	10	13	20	25	32	25	23	34	49	...	...	...	0·5
27	6	6	7	7	11	15	20	24	33	37	40	35	37	...	...	...	...	0·6
28	2	7	9	11	16	21	28	32	31	28	...	...	...	...	...	...	...	0·4
29	7	9	8	10	14	19	20	19	22	27	20	25	...	...	...	...	...	0·4
30	9	17	17	15	18	19	22	31	31	31	30	...	...	...	...	...	...	0·5
31	8	8	9	13	11	10	19	30	46	44	47	...	...	...	...	...	...	0·4
32	9	12	10	11	15	26	23	42	34	36	...	...	...	...	...	...	...	0·3
33	11	10	10	10	15	23	25	29	37	38	...	...	...	...	...	...	...	0·4
34	11	13	14	15	12	13	16	20	34	23	25	...	...	...	...	...	...	0·5
35	6	7	10	14	14	13	15	11	16	24	28	30	38	40	45	...	...	0·6
36	7	5	9	10	10	14	19	24	31	31	31	32	...	...	...	...	...	6·6
37	3	4	3	3	6	6	7	9	11	13	...	...	...	...	...	...	...	0·5
38	4	7	8	6	6	10	12	13	10	12	13	...	...	...	...	...	...	0·5
39	9	10	12	27	21	20	23	18	16	14	17	11	11	14	25	...	...	0·4
40	8	9	8	9	9	10	16	16	18	27	33	33	25	33	...	...	...	0·4
41	5	5	7	8	12	9	14	12	14	20	...	...	...	...	...	...	...	0·4
42	6	7	11	13	13	24	37	37	34	34	20	...	...	...	...	...	...	0·5
43	5	8	7	10	10	15	27	22	32	33	39	...	...	...	...	...	...	0·3
44	4	7	8	10	11	18	31	34	42	40	28	...	...	...	...	...	...	0·4
45	4	5	6	6	7	8	10	19	23	43	30	30	19	25	45	...	...	0·4
46	6	4	6	6	8	10	10	20	25	36	35	37	25	43	...	...	...	0·3
47	3	4	4	6	6	8	9	15	22	23	29	30	36	21	35	...	...	0·5
48	7	6	8	9	13	20	20	29	47	37	27	30	...	...	...	...	...	0·6
49	8	6	7	8	6	8	11	12	14	18	27	31	43	29	30	36	...	0·6
50	12	8	8	6	6	7	8	9	9	13	17	27	31	34	30	30	31	0·6
51	8	9	8	10	20	16	25	...	...	...	...	...	...	...	...	...	...	0·3
52	9	11	12	17	15	24	26	32	28	30	...	...	...	...	...	...	...	0·4
53	8	10	8	7	11	12	10	10	20	...	...	...	...	...	...	...	...	0·5
54	6	6	8	10	14	12	...	...	...	...	...	...	...	...	...	...	...	0·4
55	9	14	8	9	9	11	10	3	13	24	...	...	...	...	...	...	...	0·5
56	5	6	5	7	7	7	8	9	...	...	...	...	...	...	...	...	...	0·5
57	5	6	8	10	13	10	21	...	...	...	...	...	...	...	...	...	...	0·4
58	6	5	8	9	10	12	18	...	...	...	...	...	...	...	...	...	...	0·4
59	5	6	7	9	8	12	14	18	22	...	...	...	...	...	...	...	...	0·5
60	15	12	12	18	24	33	35	35	27	...	...	...	...	...	...	...	...	0·4
61	8	7	9	8	11	18	19	25	...	...	...	...	...	...	...	...	...	0·5
62	8	10	8	9	12	16	17	30	...	...	...	...	...	...	...	...	...	0·4
63	8	8	8	9	14	18	15	18	...	...	...	...	...	...	...	...	...	0·3
64	6	7	7	8	10	14	19	29	...	...	...	...	...	...	...	...	...	0·4
65	7	7	8	8	7	8	10	...	...	...	...	...	...	...	...	...	...	0·3
66	9	9	8	7	8	8	13	...	...	...	...	...	...	...	...	...	...	0·3
67	6	7	8	7	12	13	...	...	...	...	...	...	...	...	...	...	...	0·3
68	7	9	8	8	8	11	14	...	...	...	...	...	...	...	...	...	...	0·4
69	6	6	6	7	6	8	11	...	...	...	...	...	...	...	...	...	...	0·4
70	5	5	7	7	10	...	...	...	...	...	...	...	...	...	...	...	...	0·3
Totals ...	590	665	773	882	984	1,052	1,223	1,382	1,359	1,355	1,000	737	507	367	236	66	13	30·9
Average,	8	9	11	13	14	15	18	21	25	27	27	27	28	31	34	33	31	0·44

From numerous observations it has been ascertained that at Ránikhet chír seedlings, self-sown in the forest, take on an average 15 years to establish themselves—that is to say, they make very little growth above ground until they are about 15 years old, when, if they receive sufficient light, they shoot rapidly ahead. Hence in computing the age of chír trees from ring countings on sections made a few feet off the ground, it is necessary to add 15 to the number of years given by the counting of the concentric rings. This has been done in the following estimate of ages for different girth. The

thickness of the bark has been assumed to be 0·3 to 0·6 inch, according to the size of of the tree in question :—

Girth at breast height		6	inches,	radius	1·0	inch,	age	21	years.
"	"	12	"	"	1·9	inches	"	28	"
"	"	18	"	"	2·9	"	"	38	"
"	"	24	"	"	3·8	"	"	47	"
"	"	30	"	"	4·8	"	"	60	"
"	"	36	"	"	5·7	"	"	73	"
"	"	42	"	"	6·7	"	"	89	"
"	"	48	"	"	7·6	"	"	105	"
"	"	54	"	"	8·6	"	"	127	"
"	"	60	"	"	9·6	"	"	152	"
"	"	66	"	"	10·5	"	"	176	"
"	"	72	"	"	11·5	"	"	203	"
"	"	78	"	"	12·4	"	"	227	"
"	"	84	"	"	13·4	"	"	254	"
"	"	90	"	"	14·3	"	"	280	"
"	"	96	"	"	15·3	"	"	314	"
"	"	102	"	"	16·2	"	"	346	"
"	"	108	"	"	17·2	"	"	378	"

Thus chír in the Ránikhet forests grows fairly rapidly in diameter up to 3 feet girth or 70 years of age; the rate of diametral increment then becomes moderate up to 4 feet girth, after which it becomes extremely slow. These remarks have, of course, no bearing at all on the mean annual rate of growth in volume which will be noticed lower down.

Chír in these forests attains very nearly its maximum height on reaching a girth of about 4′ 6″, *i.e.*, at the age of about 130 years. The average height which it attains is only 100 feet, although few exceptionally well-grown trees may exceed that stature. The very tallest tree is under 120 feet high.

In order to ascertain the average contents of chír according to the various girth classes Mr. Brereton felled and measured 84 trees. He took the girth of the trunk in three places, *viz.*, at each extremity and at the middle. It would, of course, have been better to have measured the girth at every 10 feet; but as the results computed from the three girths are really slightly lower than what would have been obtained from more numerous measurements, since the shape of the trunk of a tree more nearly approaches that of a paraboloid than of a cone, the error is after all one that can be tolerated. The measurements of five of the trees have had to be rejected. Mr. Brereton's method of computation was faulty, and accordingly, in the subjoined statement, the various figures have been mainipulated *de novo* :—

Computation of contents of chír trees.

Serial number of tree.	Girth class.	Girth at breast height.	Contents of trunk.							Contents of branches.	Contents of tree.
			1st log.		*2nd log.*		Sum of areas of both sections.	Length of each log.	Contents of trunk.		
			Mean girth.	Area of corresponding section.	Mean girth.	Area of corresponding section.					
			Inches.	Sq. ft.	Inches.	Sq. ft.	Sq. ft.	Feet.	C. ft.	C. ft.	C. ft.
1	I.*a.*	9′ 6″	97	5·196	60	1·989	7·185	53	381	20	401
2	"	9′ 4″	95	4·988	51	1·437	6·425	56	360	10	370
3	"	9′ 1″	97	5·196	49	1·327	6·523	59	385	9	394
4	"	8′ 9″	93	4·778	58	1·859	6·637	57	378	2	380
5	"	8′ 8″	93	4·778	47	1·221	5·999	57	342	15	357
6	"	8′ 6″	84	3·899	50	1·382	5·281	37	195	6	201
7	"	8′ 3″	85	3·993	60	1·989	5·982	38	227	18	245
Totals ...		62′ 1″	...	...	...	...	...	357	2,268	80	2,348
Averages,		8′ 10″	...	...	...	...	...	51	324	11¼	335

Computation of contents of chir trees—(continued).

Serial number of tree.	Girth class.	Girth at breast height.	Contents of trunk. 1st log. Mean girth.	1st log. Area of corresponding section.	2nd log. Mean girth.	2nd log. Area of corresponding section.	Sum of area of both sections.	Length of each log.	Contents of trunk.	Contents of branches.	Contents of tree.
			Inches.	Sq. ft.	Inches.	Sq. ft.	Sq. ft.	Feet.	C. ft.	C. ft.	C. ft.
1	I.b.	8′ 0″	85	3·993	45	1·119	5·112	37	189	15	204
2	„	7′ 10″	85	3·993	56	1·733	5·726	38	217	6	223
3	„	7′ 6″	81	3·625	51	1·437	5·062	36	182	6	188
4	„	7′ 4″	80	3·537	49	1·327	4·864	36	175	13	188
5	„	7′ 3″	77	3·276	48	1·278	4·549	34	155	3	158
6	„	7′ 2″	77	3·276	52	1·494	4·770	34	162	2	164
7	„	7′ 2″	65	2·335	39	0·841	3·176	22	70	9	79
8	„	7′ 0″	73	2·945	41	0·929	3·874	31	120	5	125
9	„	7′ 0″	75	3·108	40	0·884	3·992	33	132	18	150
10	„	7′ 0″	75	3·108	39	0·841	3·949	33	130	Nottaken	130
11	„	6′ 10″	73	2·945	48	1·022	3·967	32	127	14	141
12	„	6′ 9″	69	2·631	36	0·716	3·347	28	94	2	96
13	„	6′ 7″	72	2·865	42	0·975	3·840	32	123	12	135
14	„	6′ 6″	68	2·555	33	0·602	3·157	29	92	9	101
15	„	6′ 4″	66	2·407	34	0·639	3·046	28	85	5	90
16	„	6′ 4″	68	2·555	34	0·639	3·194	30	96	7	103
17	„	6′ 3″	70	2·708	37	9·757	3·465	33	114	7	121
18	„	6′ 3″	69	2·631	35	0·677	3·308	45	149	8	157
19	„	6′ 3″	64	2·263	34	0·639	2·902	36	104	16	120
20	„	6′ 1″	64	2·263	34	0·639	2·902	47	136	4	140
Totals ...		137′ 5″	...	...	...	...	...	674	2,652	161	2,813
Averages ...		6′ 10″	...	...	...	...	...	33	133	8¼	141
1	II.	6′ 0″	67	2·481	39	0·841	3·322	47	156	1	157
2	„	6′ 0″	66	2·407	42	0·975	3·382	44	149	5	154
3	„	5′ 10″	60	1·989	31	0·531	2·520	42	106	12	118
4	„	5′ 9″	65	2·335	48	1·278	3·608	40	144	8	152
5	„	5′ 8″	58	1·859	29	0·465	2·324	37	86	14	100
6	„	5′ 7″	58	1·859	31	0·531	2·390	33	79	7	86
7	„	5′ 6″	60	1·989	41	0·929	2·918	24	70	14	84
8	„	5′ 3″	57	1·795	30	0·497	2·292	53	121	3	124
9	„	5′ 3″	54	1·611	30	0·497	2·108	38	80	3	83
10	„	5′ 1″	53	1·552	27	0·403	1·955	45	88	1	89
11	„	5′ 0″	54	1·611	31	0·531	2·142	36	77	6	83
12	„	4′ 11″	50	1·382	30	0·497	1·879	45	86	2	88
13	„	4′ 10″	53	1·552	28	0·433	1·985	45	89	3	92
14	„	4′ 10″	53	1·552	29	0·465	2·017	42	85	3	88
15	„	4′ 10″	53	1·552	30	0·497	2·049	39	80	1	81
16	„	4′ 10″	53	1·552	28	0·433	1·985	31	62	3	65
17	„	4′ 9″	52	1·494	28	0·433	1·927	42	81	1	82
18	„	4′ 9″	51	1·437	31	0·531	1·968	38	75	3	78
19	„	4′ 9″	53	1·552	31	0·531	2·083	38	79	...	79
20	„	4′ 7″	52	1·494	32	0·566	2·060	33	68	...	68
Totals ...		104′ 0″	...	...	...	...	...	792	1,861	90	1,951
Averages ...		5′ 2″	...	...	...	...	...	40	93	4½	98
1	III.	4′ 5″	46	1·169	25	0·345	1·514	37	56	1	57
2	„	4′ 5″	48	1·273	26	0·374	1·647	25	41	2	43
3	„	4′ 4″	48	1·273	27	0·403	1·676	32	54	2	56
4	„	4′ 3″	47	1·221	27	0·403	1·624	43	70	1	71
5	„	4′ 3″	44	1·070	24	0·318	1·388	33	46	1	47
6	„	4′ 2″	44	1·070	24	0·318	1·388	24	34	9	43
7	„	4′ 1″	45	1·119	25	0·345	1·464	40	59	...	59
8	„	4′ 1″	41	0·929	21	0·244	1·173	32	38	3	41
9	„	3′ 11″	43	1·022	23	0·292	1·314	36	47	...	47
10	„	3′ 11″	41	0·929	23	0·292	1·221	33	40	6	46
11	„	3′ 10″	44	1·070	25	0·345	1·415	43	61	...	61
12	„	3′ 10″	41	0·929	22	0·267	1·196	32	38	...	38
13	„	3′ 9″	41	0·929	22	0·267	1·196	35	42	...	42
14	„	3′ 8″	40	0·884	24	0·318	1·202	31	37	1	38
15	„	3′ 6″	37	0·757	19	0·199	0·956	39	37	2	39
16	„	3′ 6″	39	0·841	25	0·345	1·186	26	32	...	32
17	„	3′ 5″	35	0·677	20	0·221	0·898	28	25	4	29
18	„	3′ 3″	33	0·602	27	0·403	1·005	32	32	...	32
19	„	3′ 3″	33	0·602	18	0·179	0·781	28	22	1	23
20	„	3′ 3″	34	0·639	18	0·179	0·818	22	18	6	24
21	„	3′ 2″	34	0·639	19	0·199	0·338	28	23	3	26
22	„	3′ 1″	35	0·677	21	0·244	0·921	25	23	2	25
Totals ...		83′ 4″	...	...	...	...	...	784	875	44	919
Averages ...		3′ 9″	...	...	...	...	...	36	40	2	42

Computation of contents of chír trees—(concluded).

Serial number of tree.	Girth class.	Girth at breast height.	Contents of trunk. 1st log. Mean girth.	1st log. Area of corresponding section.	2nd log. Mean girth.	2nd log. Area of corresponding section.	Sum of areas of both sections.	Length of each log.	Contents of trunk.	Contents of branches.	Contents of tree.
			Inches.	Sq. ft.	Inches.	Sq. ft.	Sq. ft.	Feet.	C. ft.	C. ft.	C. ft.
1	IV.	3′ 0″	31	0·531	16	0·141	0·672	42	28	...	28
2	"	3′ 0″	30	0·497	16	0·141	0·638	28	18	...	18
3	"	3′ 0″	34	0·639	24	0·318	0·957	21	20	1	21
4	"	3′ 0″	35	0·677	30	0·497	1·174	21	25	2	27
5	"	3′ 0″	31	0·531	18	0.179	0·710	19	13	...	13
6	"	2′ 11″	29	0·465	14	0·108	0·573	26	15	1	16
7	"	2′ 10″	31	0·531	17	0·160	0·691	24	17	...	17
8	"	2′ 8″	28	0·433	14	0·108	0·541	29	16	...	16
9	"	2′ 7″	29	0·465	17	0·160	0·625	29	18	...	18
10	"	2′ 3″	23	0·292	13	0·093	0·385	29	11	...	11
Totals ...		28′ 3″	...	...	...	...	...	268	181	4	185
Averages...		2′ 10″	...	...	...	...	...	27	18	¼	18

From the preceding figures we also obtain the following results:—

Average contents of a chír tree 4 feet in girth	...	...	49	cubic feet.
" " " 5 "	...	...	89	"
" " " 6 "	...	...	116	"

Regarding the average weight of one cubic foot of chír wood in the green state in which it is delivered to the Commissariat, no reliance can be placed on Mr. Brereton's figures, as explained in page 14 in the case of oak. The wood is taken over by the Commissariat only one month after it is felled, and as it is never barked or split, the dryage of the thick resin-encrusted billets in the cool climate of these hills is naturally very limited. The average weight of the cubic foot has, therefore, been assumed at 46lb, which gives the following average weights for the trees of the various girth classes:—

Weight of average first class tree	...	...	75	maunds of 100lb.
" " second "	...	...	45	"
" " third "	...	...	20	"
" " fourth "	...	...	8	"

OAKS.

The following three oaks are found in these forests:—

Phanyáth (*Quercus annulata*).—In the warmer moist ravines up to 5,800 feet.

Banj (*Quercus incana*).—Almost from the lowest to the highest point.

Tilonj (*Quercus dilatata*).—Above 6,700 on a northerly exposure.

A few very scattered phanyáth are met with at very various points hardly numerous enough to affect the working or treatment of the forest, while tilonj is found only on the Agáspur ridge in the Ránikhet reserve. Hence, practically speaking, we have to do only with bánj.

The bánj grows in these forests almost everywhere except on the driest and sunniest slopes, but even there, if introduced, it will be able to survive and reproduce itself under the chír, which will always form a top-story above it. Protected from grazing and lopping, it thrives well in company with chír, the growth of which, and also of the crop as a whole, it improves in a marvellous manner by means of its dense, spreading, shade-enduring crown and its abundant fall of rich manure-forming dead foliage. On the gentle slopes of these forests it can also reproduce itself with ease, but the avidity with which cattle devour its young leaves, the sinful manner in which the hillmen lop and hack it, and the constant tread of the cattle have almost banished it from all but the most favourable spots and effectually prevent its extension.

There are no data for ascertaining the rate of growth of oak trees, but there is no doubt that, although they do not shoot up as fast or to the same height as chír, their growth in thickness is more constant and their average diametral increment in the long run is the same, if not somewhat larger. The average height attained by the oaks in these forests, when they have not been effectually stunted by repeated lopping, is about 55 feet, although under exceptionally favourable circumstances they may run up to 80 feet.

Regarding the average contents of trees according to the girth-classes we have very meagre data. The working plans party under me had not the time, before the advent of the snow season closed the field work, to fell and measure up trees; and Mr. Brereton experimented with only 12 trees. Still the results, re-computed from that officer's figures, are given below for what they are worth. It is obvious that, making every allowance for the present frightfully mutilated condition of the oak, the volume of an average second class tree must exceed 39 cubic feet. Nevertheless, to be on the safe side, in all subsequent estimates the figures in the statement have been adopted without any modification.

Lastly, 60lb have been assumed to be the weight of a cubic foot of fresh-cut oak wood; it is really probably a little higher. Mr. Brereton's figure is 57·5lb., which is obviously too low. Mr. Brereton computed the contents of long logs by means of the square of the quarter mean of three girths measured respectively at the two extremities and the middle. This method gives only 0·785 of the contents calculated by considering the log as a frustum of a cone which latter figure again is always less then the real contents. Hence if 57·5lb. was accurately obtained by the method adopted by Mr. Brereton, the true weight of a cubic foot of green oak wood would be much nearer 45lb, which is manifestly very much under the mark. And, indeed, Mr. Brereton himself evidently considered his results too low, since he adopted 53lb. as the average weight of a cubic foot of the various woods all round, thus obtaining 7,36,439 maunds for the total amount of marketable fuel in the Ránikhet reserve at the time he wrote his report, instead of only 5,94,048 maunds, which would be the figure if we used the results derived from his weighments.

Average contents of oak trees.

Serial number of tree.	Girth class.	Girth at breast height.	Contents of trunk.							Contents of branches.	Contents of tree.
			1st log.		2nd log.		Sum of areas of both sections.	Length of each log.	Contents of trunk.		
			Mean girth.	Area of corresponding section.	Mean girth.	Area of corresponding section.					
			Inches.	Sq. ft.	Inches.	Sq. ft.	Sq. ft.	Feet.	C. ft.	C. ft.	C. ft.
1	I.a	9′ 0″	96	5·092	76	3·362	8·454	14	118	49	167
2	"	8′ 6″	44	3·899	46	1·169	5·068	27	137	62	199
Totals ...		17′ 6″	...	...	...	...	...	...	255	111	336
Averages ...		8′ 9″	...	...	...	...	...	...	128	55	183
1	I.b	7′ 3″	87	4·183	87	4·183	8.366	5	42	77	119
Totals ...		7′ 3″	...	...	...	...	...	...	42	77	119
Averages ...		7′ 3″	...	...	...	...	...	...	42	77	119
1	II.	6′ 0″	72	2·865	...	...	2·865	7	20	26	46
2	"	5′ 10″	69	2·631	67	2·481	5·112	9	46	19	65
3	"	5′ 3″	52	1·494	40	0·884	2·378	9	21	5	26
4	"	5′ 3″	59	1·924	52	1·494	3·518	5	18	23	41
5	"	4′ 8″	56	1·733	...	...	1·733	7	12	7	19
Totals ...		27′ 0″	...	...	...	...	...	...	117	80	197
Averages ...		5′ 5″	...	...	...	...	...	...	23	16	39

Average contents of oak trees—(concluded).

Serial number of tree.	Girth class.	Girth at breast height.	Contents of trunk. 1st log. Mean girth.	1st log. Area of corresponding section.	2nd log. Mean girth.	2nd log. Area of corresponding section.	Sum of areas of both sections.	Length of each log.	Contents of trunk.	Contents of branches.	Contents of tree.
			Inches.	Sq. ft.	Inches.	Sq. ft.	Sq. ft.	Feet.	C. ft.	C. ft.	C. ft.
1	III.	4′ 3″	41	0·929	19	0·199	1·128	14	16	...	16
Totals ...		4′ 3″	...	...	...	...	...	...	16	...	16
Averages ...		4′ 3″	...	...	...	...	...	...	16	...	16
1	IV.	3′ 0″	35	0·677	23	0·602	1·279	4	5	4	9
2	"	2′ 2″	22	0·267	17	0·160	0·427	8	3	...	3
Totals ...		5′ 2″	...	...	...	...	...	...	8	...	12
Averages ...		2′ 7″	...	...	...	...	...	...	4	2	6

Adopting, as said before, in the absence of more accurate data, the above figures, we have the following for the average yield of firewood from oak trees of the various girth classes:—

Class I	... ...	72 maunds of 100lb.
" II	... ...	21 "
" III	... ...	9 "
" IV	... ...	3 "

BRONS (*Rhododendron arboreum*) AND AYAR (*Pieris ovalifolia*).

The ayár first puts in an appearance at about 5,400 feet in the ravines and on the moister slopes, but becomes general only about 400 feet higher up and extends up to the highest point attained in the forests. It presents no other characteristics special to the locality. Unlike brons, it spreads into chír forest, where it grows scattered under the upper story of pine.

Mr. Brereton cut up and measured only five ayár trees distributed in three classes. The results obtained from the remanipulation of his figures are given below. They are manifestly a little too low for class II and appreciably too high for class III:—

Average contents of ayár trees.

Serial number of tree.	Girth class.	Girth at breast height.	Contents of trunk. 1st log. Mean girth.	1st log. Area of corresponding section.	2nd log. Mean girth.	2nd log. Area of corresponding section.	Sum of areas of both sections.	Length of each log.	Contents of trunk.	Contents of branches.	Contents of tree.
			Inches.	Sq. ft.	Inches.	Sq. ft.	Sq. ft.	Feet.	C. ft.	C. ft.	C. ft.
1	II.	5′ 2″	54	1·611	42	0·975	3·586	6	16	3	19
Totals ...		5′ 2″	...	...	...	...	...	...	16	3	19
Averages ...		5′ 2″	...	...	...	...	...	...	16	3	19
1	III.	4′ 6″	39	0·841	22	0·267	1·108	11	12	2	14
2	"	4′ 6″	52	1·494	1·491	...	1·494	8	12	14	26
Totals ...		8′ 10″	...	...	...	...	...	...	24	16	40
Averages ...		4′ 5″	...	...	...	...	...	...	12	8	20
1	IV.	2′ 7″	29	0·465	26	0·374	0·839	3	3	1	4
2	"	2′ 3″	27	0·403	...	...	0·403	3	1	2	3
Totals ...		4′ 10″	...	...	..	...	...	...	4	3	7
Averages ...		2′ 5″	...	...	...	...	...	...	2	1½	3½

Brons begins to show itself about 200 feet higher up than ayár, and is, *par excellence*, the companion of bánj on the moister and richer soils. Mr. Brereton cut up and measured 16 trees, the contents of which are tabulated below :—

Average contents of brons trees.

Serial number of tree.	Girth class.	Girth at breast height.	Contents of trunk. 1st log. Mean girth.	1st log. Area of corresponding section.	2nd log. Mean girth.	2nd log. Area of corresponding section.	Sum of areas of both sections.	Length of each log.	Contents of trunk.	Contents of branches.	Contents of tree.
			Inches.	Sq. ft.	Inches.	Sq. ft.	Sq. ft.	Feet.	C. ft.	C. ft.	C. ft.
1	I.a	8′ 3″	99	5·416	...	...	5·416	10	54	55	109
2	"	8′ 1″	90	4·476	81	3·625	8·101	9	73	34	107
Totals ...		16′ 4″	...	...	...	...	...	...	127	89	216
Averages ...		8′ 2″	...	...	...	...	...	...	63	45	108
1	I.b	7′ 7″	80	3·537	69	2·631	6·168	4	25	32	57
2	"	7′ 0″	84	3·899	...	...	3·899	6	23	34	57
3	"	6′ 5″	76	3·192	74	3·026	6·218	5	31	24	55
4	"	6′ 8″	65	2·335	40	0·884	3·219	15	48	6	54
5	"	6′ 2″	73	2·945	72	2·865	5·810	5	29	23	52
Totals ...		33′ 5″	...	...	...	...	...	...	156	119	275
Averages ...		6′ 8″	...	...	...	...	...	...	31	24	55
1	II.	5′ 1″	61	2·056	...	...	2·056	5	10	19	29
2	"	4′ 7″	53	1·552	48	1·273	2·825	7	16	11	37
Totals ...		9′ 8″	...	...	...	...	...	...	26	30	56
Averages ...		4′ 10″	...	...	...	...	...		13	15	28
1	III.	4′ 0″	45	1·119	42	0·975	2·094	3	6	8	14
2	"	3′ 11″	46	1·169	...	...	1·169	7	8	10	18
3	"	3′ 1″	35	0·677	32	0·566	1·243	15	19	4	23
Totals ...		11′ 0″	...	...	...	...	...	...	33	22	55
Averages ...		3′ 8″	...	...	...	...	...	...	11	7½	18
1	IV.	3′ 0″	36	0·716	...	...	0·716	6	4	3	7
2	"	2′ 10″	27	0·403	24	0·318	0·721	8	6	1	7
3	"	2′ 7″	31	0·531	...	...	0·531	8	4	4	7
4	"	2′ 6″	29	0·465	28	0·433	0·898	5	4	3	8
Totals ...		10′ 11″	...	...	...	...	...	...	18	11	29
Averages ...		2′ 9″	...	...	...	...	...	...	4½	2¾	7¼

Combining the results of the two preceding statements, and assuming that the average contents according to girth classes of the few individuals of other species is not appreciably different and that the average weight per cubic foot all round is 46lb., we have for the average weights of trees other than chír and oak the following figures :—

Girth class	I	...	30 maunds of 100lb.
"	II	...	14 "
"	III	...	8 "
"	IV	...	2 "

When the forests have been under protection for some time these figures will no doubt be considerably exceeded, but they will be found sufficiently near the mark during at least the currency of the present working plan.

Article III.— Quantity of standing stock.

In the subjoined statement is exhibited the quantity of the standing stock, including all stems above 18 inches diameter :—

Species of tree.	Girth class.	Sauni.		Siún.		Kathálekh.		Ganiádeoli.		Chiliánáo.		Kárchúli.		Padholi.	
		Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.
Chír	I	3,064	2,29,800	1,189	89,175	3,402	2,55,150	1,015	76,125	340	25,500	774	58,050	829	62,175
	II	9,632	4,33,440	1,104	49,680	6,737	3,03,165	4,239	1,90,755	1,887	84,915	1,075	48,375	2,687	1,20,915
	III	26,812	5,36,240	4,393	87,860	21,831	4,36,620	9,627	1,92,540	5,538	1,10,760	1,469	29,380	5,815	1,16,300
	IV	1,23,094	9,84,752	12,130	97,040	54,404	4,35,232	13,429	1,07,432	30,124	2,40,992	6,001	48,008	36,640	2,93,120
Totals ...	...	1,62,602	2,184,232	18,816	3,23,755	86,374	1,430,167	28,310	5,66,852	37,889	4,62,167	9,319	1,83,813	45,971	5,92,510
Oaks... ...	I	7,085	5,10,120	2,024	1,45,728	306	22,032	2	144	...	...	...	...	42	3,024
	II	9,702	2,03,742	2,332	48,972	464	9,744	8	168	...	...	...	...	87	1,827
	III	18,577	1,67,193	4,492	40,428	1,745	15,705	52	468	6	54	...	...	386	3,474
	IV	43,071	1,29,213	7,421	22,263	3,890	11,670	154	462	23	69	1	3	1,375	4,125
Totals ...	...	78,435	1,010,268	16,269	2,57,391	6,405	59,151	216	1,242	29	123	1	3	1,890	12,450
Other species	I	994	29,820	387	11,610	60	1,800	1	30	1	30	...	...	19	570
	II	3,491	48,874	842	11,788	238	3,332	7	98	4	56	...	...	63	882
	III	11,516	92,128	2,267	18,136	1,769	14,152	70	560	60	480	6	48	466	3,728
	IV	60,887	1,21,774	12,936	25,872	7,246	14,492	292	584	1,340	2,680	64	128	4,138	8,276
Totals ...	...	76,888	2,92,596	16,432	67,406	9,313	33,776	370	1,272	1,405	3,246	70	176	4,686	13,456
Grand Total ...	...	3,17,925	3,487,096	51,517	6,48,552	1,02,092	1,523,094	28,896	5,69,366	39,323	4,65,536	9,390	1,83,992	52,547	6,18,416

Species of tree.	Girth-class.	Dwarsaun.		The Reserve.		Chaubattia West.		Chaubattia East.		Totals for all the forests.	
		Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.	Number of trees.	Number of maunds.
Chír	I	437	32,775	2,066	154,950	474	35,550	635	47,625	14,225	1,066,875
	II	1,429	64,305	22,408	1,008,360	906	40,770	2,849	128,205	54,953	2,472,885
	III	2,750	55,000	32,000	640,000	2,440	48,800	7,091	141,820	119,766	2,395,320
	IV	35,564	284,512	42,000	336,000	4,930	39,440	16,520	132,160	374,836	2,998,688
Totals ...	...	40,180	436,592	98,474	2,139,310	8,750	164,560	27,095	449,810	563,780	8,933,768
Oaks	I	933	67,176	1,148	82,656	231	16,632	540	38,880	12,311	886,392
	II	1,374	28,854	4,407	92,547	359	7,539	1,158	24,318	19,891	417,711
	III	4,154	37,386	6,000	54,000	1,247	11,223	4,060	36,540	40,719	366,471
	IV	12,934	38,802	9,000	27,000	1,187	3,561	11,099	33,297	90,155	270,465
Totals ...	...	19,395	172,218	20,555	256,203	3,024	38,955	16,857	133,035	163,076	1,941,039
Other species	I	146	4,380	148	4,440	32	960	226	6,780	2,014	60,420
	II	469	6,566	3,040	42,560	90	1,260	608	8,512	8,852	123,928
	III	1,940	15,520	10,000	80,000	261	2,088	2,829	22,632	31,184	249,472
	IV	8,587	17,174	17,000	34,000	778	1,556	12,455	24,910	125,723	251,446
Totals ...	...	11,142	43,640	30,188	161,000	1,161	5,864	16,118	62,834	167,773	685,266
Grand Totals ...	...	70,717	652,450	149,217	2,556,513	12,935	209,379	60,070	645,679	894,629	11,560,073

In the case of each forest, with a single exception to be presently noticed, the number of the trees have been ascertained by means of a complete enumeration survey of the trees under the following four girth-classes:—

Class I	...	...	...	...	girth above 6 feet				
„ II	...	...	...	...	„	„	4′ 6″	and up to	6 feet.
„ III	...	...	...	...	„	„	3′ 0″	„	4′ 6″
„ IV	...	...	...	...	„	„	1′ 6″	„	3′ 0″

Chír, the various oaks (actually phanyáth and banj, brons), and, ayár were counted and registered separately; all the remaining species were counted together under the head of "miscellaneous species."

The single exception referred to in the foregoing paragraph is that of the Ránikhet reserve, in which an enumeration survey was made so long ago as 1878-79 by Mr. Brereton under the four following classes:—

Class I	...	...	...	...	girth above 8 feet.				
„ II	...	...	...	...	„	„	6 „	and up to	8 feet.
„ III	...	...	...	...	„	„	4 „	„	6 „
„ IV	...	...	...	...	„	„	2 „	„	4 „

The Inspector-General of Forests objected to this classification, but a resurvey under the usual girth-classes was not included in the programme of the party deputed to prepare a general working plan for all the forests now dealt with, and I have, therefore, been obliged to use Mr. Brereton's figures with certain modifications. His two highest classes I have obviously included together in the ordinary first class, while his third class has been treated without any alteration as the ordinary second class. No great error can arise from this procedure, for, eight years having elapsed since the survey in question was made, the number of the ordinary first class trees has necessarily increased, and many of the trees that were originally not more than 4′ 6″ in girth have obviously now entered the ordinary second class; so that, although the actual number of trees of this latter class may not be so large as that adopted, the increase in the first class, which has not been allowed for, will effect the necessary compensation. The main difficulty lay in obtaining approximately correct figures for the ordinary third and fourth classes. In this matter I have used my own judgment based on my knowledge of the standing stock. Nevertheless, in order to be sure of being on the safe side, I have purposely assumed a comparatively low estimate of the number of poles in the fourth class. As very few such poles will be worked out, and as the quantity of material they will yield will be relatively insignificant, any resulting error will not materially affect the execution of the working plan, and will have no further drawback, if that can be considered a drawback, than that of rendering the forecast of the future of the forest slightly less promising than that future will eventually prove to be.

As the enumeration surveys in either case were made many years ago, the results obtained directly from them have been diminished by the number of trees of the several classes that have been felled since then.

CHAPTER III.—ECONOMIC CONDITIONS.

In this chapter will be considered :—

I.—Description of produce the forests can yield.
II.—Requirements which the forests have to meet.
III.—Communications and mode of export.
IV.—Mode of working and selling and working rates.
V.—Past revenue and expenditure.

SECTION I.—DESCRIPTION OF PRODUCE THE FORESTS CAN YIELD.

Chír is practically the only timber used in these hills for building. It here contains a comparatively large quantity of resin, which in the favourable local climate keeps it sound, unless completely exposed to weather influences, for from one to two generations. Inside buildings chír heart-wood, if properly seasoned, possesses

very great durability. Chír is also suitable for rough furniture that is not subjected to much strain or friction.

Oak and other true hard woods being relatively scarce, and being also valuable fodder-yielding trees, these forests can, for the present at least, only furnish a comparatively limited quantity of first class firewood, but, in making good the deficiency, chír forms a fairly good substitute.

Agricultural implements are made mostly of oak.

As regards minor produce, we have (*a*) fodder and thatching-grass in great abundance; (*b*) dead pine needles, which, under proper check and control, may be removed with great profit to the forest growth, for litter and manure; (*c*) a certain amount of leaf-fodder from professionally regulated lopping; (*d*) chír resin and its products in large quantities, and (*e*) chír and other bark for tanning and for smithy purposes.

Lastly, there are such extraneous products as slates, building stone, impure graphite, &c.

SECTION II.—REQUIREMENTS TO BE MET.

The requirements to be met from these forests need be considered only under the following four main heads :—

(1) Firewood for the Ránikhet garrison; (2) Gratuitous supply of various forest products to villagers; (3) Timber, wood, &c., sold to the general public, and (4) Timber and wood used up by the Department.

Article 1.—Firewood for the garrison.

It is mainly to this item that is due the great importance of properly managing these forests, and the sole object of the present working plan is to provide in a permanent manner for this supply, without causing any hardship to the inhabitants of the surrounding villages.

The present strength of the garrison is 1½ battalions, a whole battalion being located in the Ránikhet or lower portion of the cantonment and the half battalion about 500 feet higher up on the Chaubattia ridge. Until 1881 the troops remained in garrison the whole year round; but since that year all, with the exception of invalids and depôt, go down to the plains during November—March, or the season of the year when most firewood would be consumed.

In the absence of sufficient oak and other hard woods conveniently situated, and owing to the great abundance of chír right up to the limits of the cantonment, the respective quantities of chír, oak, and other firewood supplied is roughly in the proportion of 75 : 18 : 7.

During the past six years the total consumption has been—

In 1880-81	...	...	...	...	75,002	maunds of	100 seers
„ 1881-82	...	...	...	...	94,919	„	„
„ 1882-83	...	...	...	...	44,147	„	„
„ 1883-84	...	...	...	...	56,531	„	„
„ 1884-85	...	...	...	...	59,462	„	„
„ 1885-86	...	...	...	...	50,508	„	„
Average per year in round numbers			...	...	63,500	„	„

The annual consumption per battalion may thus be taken at 42,300 maunds, and actually the average annual deliveries during the past six years at the Ránikhet and Chaubattia Commissariat depôts have been respectively, in round numbers, 47,100 and 16,400 maunds.

Article 2—Supply to villagers.

The various items of forest produce which these forests have to furnish gratis to the villagers may be grouped under five separate classes as follows :—

A.—Grazing and fodder and thatching-grass.

B.—Wood for building and agricultural implements and charcoal for smithy work.

C.—Firewood from fallen wood.

D.—Green and dry leaves.

E.—Fruits and roots.

A.—Grazing and Fodder and Thatching-grass.

The number of head of cattle which may be grazed free is shown by forests in the subjoined statements The actual number grazed is, however, very fortunately considerably less. I have not been able to ascertain what it is, but it may be taken at 80 per cent. of the figures given, and it is worthy of record that most of the cows and buffaloes are away down in the Bhábar from October to July:—

Number of head of villagers' cattle liable to be grazed free.

Name of forest.	Average.	Number of head of cattle.							
		Cows.		*Buffaloes.*		*Goats.*		*Cattle of all kinds.*	
		Total.	Per acre.	Total.	Per acre.	Total.	Per acre.	Total.	Per acre.
Sauni	4,425	8,187	1·85	1,048	0·24	1,813	0·41	11,048	2·5
Siún	727	1,513	2·08	94	0·13	528	0·73	2,135	2·94
Kathálekh	1,813	2,792	1·54	226	0·12	564	0·31	3,582	1·98
Ganiádcoli	909	2,694	2·96	376	0·41	602	0·66	3,672	4·04
Chiliánáo	612	1,088	1·78	78	0·13	336	0·55	1,502	2·45
Kárchúli	216	770	3·57	72	0·33	318	1·48	1,160	5·37
Padholi	944	3,352	3·55	174	0·18	1,990	2·10	5,516	5·84
Dwársaun	1,514	4,448	2·94	150	0·09	2,590	1·71	7,188	4·75
Chaubattia, East and West ...	1,204	1,538	1·28	50	0·04	732	0·61	2,320	1·93
Total ...	12,364	26,382	2·1	2,268	0·2	9,473	0·8	38,123	3·1

As regards fodder grass, the villagers are not in the habit generally of laying up a store of hay, since most of their cattle, as already just mentioned, descend into the Bhábar before the grass on the hills is dry and return by the time a fresh crop is again on the ground. It would be a difficult and indeed an impossible matter to persuade the people to feed their cattle in stalls while the forests are full of fresh green grass; and the contingency will always remain to be faced of the heaviest grazing in the rains, when it is more harmful for forest reproduction and growth than at any other time. Nevertheless, the people might be gradually taught to store up some hay in ricks, in the same manner as they store up the straw from their crops and as they actually do hay for sale along the Rámnagar-Ránikhet cart-road. The present severity of the grazing and the ruthless lopping of oak and other broad-leaved trees when the grass in the forests is dry may, to a certain extent, be thereby mitigated.

The case of thatching-grass is entirely different. As a rule the kinds that yield fodder are not used for thatching, and hence the larger the quantity removed the better in the interests of protection and reproduction. But actually the quantity taken out is not large; dwelling-houses are ordinarily covered with slates, and it is only temporary sheds that are thatched.

B.—Wood for Building, Agricultural Implements, and Smithy Charcoal.

The average number of trees of the various classes given annually to the villagers for the above purposes during the past five years has been as follows:—

Forest.	Chír.		Oak.		Other species.		Total of all kinds.		Grand Total.
	Trees above 4′ 6″ in girth.	Poles up to 4′ 6″ in girth.	Trees above 4′ 6″ in girth.	Poles up to 4′ 6″ in girth.	Trees above 4′ 6″ girth.	Poles up to 4′ 6″ in girth).	Trees above 4′ 6″ in girth.	Poles up to 4′ 6″ in girth.	
Sauni	242	1,495	...	290	1	19	243	1,804	2,047
Siún	9	83	...	6	...	...	9	89	98
Kathálekh	49	254	...	30	...	...	49	284	333
Ganiádeoli	29	114	...	...	...	...	29	114	143
Chiliánáo	2	15	...	...	...	...	2	15	17
Kárchúli	2	65	...	...	...	...	2	65	67
Padholi	31	374	...	5	...	...	31	379	410
Dwársaun	22	192	...	41	...	...	22	234	256
The Chaubattias ...	42	146	...	20	...	1	42	166	208
Total for all the forests...	428	2,738	...	392	1	20	429	3,150	3,579

At present much wood is wasted by the villagers, 1*stly*, because of the ignorance of, and antipathy to, the use of the saw; and 2*ndly*, because much of the wood used in the construction of temporary sheds is so carelessly placed that it rots completely in from one to two years. Time will no doubt rectify this drawback and reduce the requirements of the people to a more reasonable figure. Indeed, very much progress has already been attained, for the average annual figures for chír for the ten years preceding 1881-82 were—

	Trees.	Poles.	Total.
Sauni	533	1,170	1,703
Siún	70	147	217
Kathálekh	193	286	479
Ganiádeoli	171	199	370
Chiliánáo	126	118	244
Kárchúli	14	14	28
Padholi	207	263	470
Dwársaun	207	67	274
The Chaubattias	221	394	615
Total ...	1,742	2,658	4,400

Besides this, the Ránikhet reserve, up to the time it became a reserved forest in 1879, contributed on an average 314 trees and 204 poles of chír annually. And when, in 1871, the forests first came under the control of the Department, the people frequently asked for as many as 40 trees to build a single small house.

The poles are nearly all of the fourth class, *i.e.*, from 18 inches to 3 feet in girth, while the trees seldom exceed 6 feet. The logs or spars taken out of these two sizes of trees are known respectively as *dunddr* and *bansa*. Their average dimensions are respectively 15′—20′ length by 15″—20″ girth in the middle and 20′—30′ by 21″—30″.

In dressing their timber before exporting it, the men leave behind in the forest a considerable proportion of the refuse wood, which may be afterwards removed as fuel by themselves or by the Department for the use of the garrison.

C.—Firewood from Fallen Wood.

No estimate can be made of the quantity of such wood removed. All that we know is that it is less than what is actually available, and there is every year a surplus left for export by the Department. This item can hence, obviously, never be a source of anxiety in the management and treatment of these forests.

D.—Green and Dry Leaves.

The removal of green leaves from trees other than chír takes place on a very large scale and is the curse of these forests. Hardly a single tree escapes severe and

irreparable mutilation. There is apparently no means of stopping this miserable practice except for a time by closing limited areas. A more effective remedy, since the practice cannot be entirely abolished, would be the absolute permanent reservation of certain definite portions.

The removal of dry leaves, mainly needles of the pine, can never become sufficiently wholesale to do harm to the forests; and, indeed, wherever reproduction specially undertaken, it will do more good than harm.

E.—Fruits and Roots.

No remarks need be made on this subject.

Article 3.– Produce supplied to other Public Departments and the general public.

This constitutes a very small item. The firewood and charcoal consumed by the residents and the bazaar have hitherto been supplied from the forests within cantonment limits. These forests, which are administered exclusively by the cantonment authorities, have, however, it is believed, been worked very much beyond their capability, and an examination of its resources is at present in progress. It is expected that the results of this examination will prove the advisability of going elsewhere for the charcoal supply, which can, however, be easily furnished from the Bhatronj protected forest.

Should the garrison be increased, as is very probable, a large quantity of timber will be required for the construction of new barracks and other quarters. It will be shown afterwards that a very large reserve balance of chír timber is available in the forests dealt with in this working plan, and even if that does not suffice to meet the requirements in question, other forests situated further away can be drawn upon.

During the past five years the average annual number of trees sold has been as follows :—

		Trees.	Poles.	Total.
To Public Works Department	Chír ...	1	...	1
" private purchasers	Chír ...	109	117	226
	Oak ...	1	1	2
	Total ...	111	118	229

Article 4.—Requirements of the Department.

During the past five years the Department has used for its own purposes at the rate of 10 mature trees and 1,000 poles (nearly all under 18 inches in girth) of chír a year and about 10 oak trees under 4 feet in girth. Most of the chír poles were used for fencing, and such employment of chír poles on a large scale will not often recur in the future.

If sledge-roads in short lengths ultimately prove the most economical principal mode of export from the Ránikhet reserve, about 2,000 poles up to 2 feet in girth will be annually required for their construction and maintenance.

Section III.—Communications and Mode of Exports.

All the forests, except Siún and Kárchúli and the two Chaubattias, are directly connected with the station by means of the military cart-road which passes the commissariat fuel godown belonging to the lower cantonment of Ránikhet. Siún is, however, within fairly easy distance of that cart-road, and Kárchúli lies just above a good bridle-road within three miles of the station; while the Chaubattias almost adjoin the upper commissariat fuel depôt on the Chaubattias ridge, to which only coolie carriage is at present possible.

Although the cart-road forms the boundary on one side of the Ránikhet reserve, still that forest is generally so close to the station that most of the produce from it is most economically carried out direct on coolies, especially to the Chaubattia depôt.

It has been ascertained by experiment that the average load of a 2-bullock cart, such as is used in the hills here, is only 9 maunds of 100lb.

Besides the cart-road there are several bridle-roads and carrying paths which will be found specified in the separate description of each forest. These are easily and cheaply constructed on the gentle slopes and soft rock characteristic of the hills here. The following have hitherto been the average rates of construction per mile :—

Width 5 feet	...	...	...	...	...	cost	Rs.	50
" 4 "	...	...	...	...	...	"	"	37½
" 3 "	...	...	...	...	...	"	"	15

Besides carriage by bullock-carts, which was introduced so late as 1881, the only other mode of export used is carriage by coolies. Each coolie carries from 1½ to 2½ maunds, or very much more than half a mule or pony load. Thanks to this fortunate circumstance, the troublesome method of mule and pony carriage, which, moreover, requires special roads, is entirely unknown here.

Rates of carriage are given in the next chapter.

SECTION IV.—MODE OF WORKING AND RATES.

Produce given or belonging to right-holders.—The timber and wood for agricultural implements and smiths' charcoal required by the right-holders is cut and removed by themselves on the permission of the Divisional Officer, who marks the trees which alone they can take out. The collection and removal of fuel from fallen wood requires no special authority from any official.

Commissariat fuel.—The cutting and export of the commissariat fuel is effected entirely by departmental agency under the following agreement :—

"I.—An indent shall be sent in to the Forest Officer, Naini Tál Division, during the first half of February in each year, showing the probable monthly requirements during the ensuing official year (in pounds) for * * *, Ránikhet, and Chaubattia separately.

"II.—In the event of less or more fuel than that specified by the indent being required, notice must be given two months beforehand ; otherwise the Commissariat Department must take over the full amount of their indent.

"III.—Green or dry wood of pine or hard woods will be cut up by the Forest Department in lengths not exceeding 18 inches, and of any girth not less than 8 inches, and delivered in the commissariat fuel depôts at * * *, Ránikhet, and Chaubattia by weighment, if green, one month after cutting.

"IV.—Weighments to be made daily when fuel is being carried, and daily receipts given to the Forest Munshi. A monthly receipt in English to be sent to the Forest Officer on the last day of the month for weighments during that month.

* * * * * * * *

"V*a*.—Should larger quantities than those specified in the indent for any particular month be carried to the commissariat depôts at Ránikhet and Chaubattia, the Commissariat Department may refuse to take delivery of the excess fuel carried until the following month.

"VI.—Bills will be submitted to the Commissariat Officer, Ránikhet, as soon after the first of the month as possible, for fuel delivered during the previous month.

"VII.—The rate to be * * * for Ránikhet and Chaubattia annas seven and pie one per hundred pounds for all classes of fuel."

The working rates are based on the following average figures :—

							Rs. a. p.
Felling 100 trees of sorts, 2′ 7″ and upwards in girth							3 2 0
Cutting up into regulation-size billets 100 maunds of 100lb each							4 2 8
Cartage of 100 maunds per mile							1 8 0
Coolie carriage ...	1	1½	2	2½	3	3½	4 miles.
	Rs. 4-2-8	5-0-8	8-5-4	10-6-8	13-0-4	15-10-0	18-12-0

The felling of trees below 2′7″ in girth is not paid for separately, but is included in the preparation of the billets.

The average rates for the different forests, calculated on the basis of the preceding figures, are exhibited in the statement below. The actual rates will of course vary from year to year, as the length of either description of carriage varies with the changing locality of the fuel operations. Moreover, the rates of carriage from blocks I and IV of the reserve will depend on whether the wood is taken to the Ránikhet or Chaubattia depôt :—

From forest.	To depôt.	Average distance of carriage.		Cutting up and carriage of 100 maunds of 100lb each.	Remarks
		By cart.	On coolie.		
		Miles.	Miles.	Rs. a. p.	
Sauni	Ránikhet ...	12	2	30 8 0	
Siún	...	5½	4	31 4 0	
Kathálekh	...	8½	2	25 15 0	
Ganiúdeoli	...	3½	1½	15 0 8	
Chiliánáo	...	...	2½	14 9 4	
Padholi	...	3	2*	18 0 0	*Steep climb.
Dwársaun	...	6	1	17 10 4	
Reserve, block I	...	...	2½	13 9 4	
" " IV	...	4	2	18 12 0	
Chaubattia West	...	...	2½	14 9 4	
" East	Chaubattia ...	...	2½	14 9 4	
Reserve, blocks II and III ...	...	...	2½	14 9 4	

The price received from the Commissariat Department was formerly Rs. 41-7-5 per 100 maunds of 100lb; but the supply then came from adjoining forests, and the present rate of Rs. 44-4-4 was fixed in order to compensate for greater distance of carriage.

The gross proceeds from and expenditure on the fuel operations since their inception, and the proportion between income and cost, are given in the subjoined statement, annas and pies being omitted :—

Year.	Gross revenue.	Expenditure.	Percentage of expenditure to revenue.	Remarks.
	Rs.	Rs.		
1877-78 ...	...	50	...	The percentage of expenditure to revenue cannot be calculated for each separate year, as part of the expenditure in some years was followed by income only in the following year.
1878-79 ...	47,726	18,077	...	
1879-80 ...	3,014	3,442	...	
1880-81 ...	31,020	16,413	...	
1881-82 ...	42,214	22,885	...	
1882-83 ...	19,651	15,269	...	
1883-84 ...	25,054	14,485	...	
1884-85 ...	26,324	13,314	...	
1885-86 ...	23,360	10,291	...	
Total ...	2,17,363	1,14,226	53	
Average ...	27,170	14,278	53	

The expenditure given includes only disbursements to workmen and contractors and contains no part of the pay and allowances of establishments, which are a variable item according to the class and grade of the officers and superior subordinates in charge at different times, but which, under the most favourable circumstances, must increase the expenditure by at least 30 per cent.

If we take the corresponding figures for the preceding six years only, we have the following annual average:—

Gross revenue.	*Expenditure.*	*Proportion of expenditure to revenue.*	*Net value of one maund of firewood.*
Rs.	Rs.		
27,770	15,443	Nearly 56 per cent.	3 annas 1 pie.

Produce sold to other departments and the general public—Wood sold thus is usually felled, converted, and removed by the purchasers themselves. In the case of standing trees, these are first marked by a forest official.

The selling rates of standing chír trees are as under:—

Up to 18″ girth	... ...	4 annas per tree
Above 18″ and up to 2′6″ girth	... ...	10 „ „
„ 2′6″ „ „ 5′ „	... ...	3 rupees „
„ 5′ „ „ 6′ „	... ...	5 „ „

For every additional foot or part of a foot above 6 feet in girth, Rs 2.

The grass in the Ránikhet reserve is disposed of to a single lessee, as sale of small quantities by means of passes to a number of individuals is considered to leave room for dishonesty on the part of the establishment. As regards tar, this is prepared by the purchasers themselves from old resinous stumps and chips, and the royalty paid thereon is 2 annas per gharra (about 24lb) The royalty levied on roofing slates is 8 annas per hundred, and on building stone 8 annas per mensem per quarry, irrespective of the number of coolies employed.

Section V.—Past Revenue and Expenditure.

The revenue from and expenditure on these forests since 1876-77 have been as follows:—

Year.	Revenue.	Expenditure. A.	Expenditure. B.	Total
	Rs.	Rs.	Rs.	Rs.
1876-77	11,657	6,402	5,430	11,832
1877-78	12,711	4,012	10,006	14,018
1878-79	53,284	20,714	10,587	31,301
1879-80	6,632	5,167	8,500	13,667
1880-81	35,448	18,043	10,049	28,092
1881-82	45,146	25,789	5,450	34,239
1882-83	21,154	18,382	4,286	22,668
1883-84	27,405	16,323	6,772	23,095
1884-85	28,196	15,687	9,137	24,824
1885-86	24,702	11,370	1,264	12,634
Total ...	2,66,335	1,41,889	74,481	2,16,370
Average per annum ...	26,633	14,189	7,448	21,637

The above figures do not of course include any items connected with the forest garden at Chaubattia, nor do they include a share of the direction charges, which amount on an average to Rs. 2,000 per annum. The whole of the Divisional Officer's salary and allowances have, however, been debited, except for 1885-86, at the beginning of which year the Ránikhet forests became a subdivision of the Naini Tál Division. The average annual surplus has been Rs. 5,000 if direction charges be excluded, and only Rs. 3 000 if they be included.

Part II.

DETAILED DESCRIPTION OF THE FOREST.

CHAPTER I.—THE SAUNI FORESTS.

Situation and boundaries.—This forest extends in a compact mass, with the exception of 532 acres attached thereto as a pendant at the south-western extremity, between 29°35′40″ and 29°39′42″ north latitude and 79°20′40″ and 79°24′15″ east longitude. By far the greatest portion of it lies in Pattis Malla and Talla Silour of pargana Páli Pachâon; but a long strip belongs to Patti Kakláson of the same pargana and a small detached portion to Patti Chauthán of pargana Dhaniákot. For a little more than a mile its boundary on the south-east marches with that of the Kathálekh protected forest; everywhere else it is conterminous with village lands.

Area.—4,425 acres, of which 316 unproductive.

Enclosed private and other lands.—There are six such plots, *viz.*:—

	Acres.
Cultivation, chak Patti Kháta	8·3
" " Sukel Kháta	3·7
" " Chauka	0·6
" " Dhura Khet	50·5
Ground round Riunchi Military Works Inspection Bungalow	8·2
Sauni Camping-grounds	8·8
Total ...	80·1

Number of compartments.—33.

Topography.—The central portion consists of the almost entire basin of the Kunchgarra gád, a perennial stream which flows south-east. In this basin north-easterly slopes predominate, and after them south-easterly aspects are best represented. The watershed line on the right is formed by a sharp ridge which rises from 6,400 to 6,615 feet above the sea and runs nearly due north and south. The forest extends across this ridge for a short distance down the steep westerly slopes forming its opposite flank. At its southern extremity the ridge breaks off into two large spurs, one running out south-west and the other east A portion of the forest, comprising four compartments, sits aside the former spur, while the latter forms the watershed line between the Kunchgarra basin on the north and the Rikh gád basin, which contains the southern portion of the forest and opens out to the east on the south. The northern portion of the forest comprises the head-waters of the Baiála gád and the Ranjaghát gádhera, both of which streams flow out northwards.

As a rule, the surface configuration consists of numerous large well-defined spurs, containing between them the deep but generally broad minor basins of feeders of the streams already mentioned above. The sides of these smaller basins are generally furrowed by numerous deep or shallow ravines and gullies with rounded contours between. The ruling gradients vary between 20° and 35°, but there are several broad expenses of easier slopes and scarps are seldom met with.

Elevation.—Maximum 6,615 feet, minimum 4,963, mean 5,900 feet.

Soil and underlying rock.—The ridges and slopes are formed of the usual micaceous schistose sandstone, which sometimes becomes quartzitic. Owing to the great variety of aspect and elevation we here find all the types of soils met with in the Siún as well as in the Kathálekh forest.

Stock.—The following statement gives the results

Species.	Diameter class.	Compartment 1, area 89 acres.		Compartment 2, area 141 acres.		Compartment 3, area 196 acres.		Compartment 4, area 106 acres.		Compartment 5, area 153 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	24	·26	101	·71	184	·94	36	·33	236	1·54
	II.	184	2·06	436	3·08	495	2·52	212	2·	208	1·35
	III.	374	4·20	799	5·66	399	2·03	729	6·87	6,513	9·88
	IV.	293	3·29	1,396	9·90	2,076	10·59	872	8·22	7,283	47·60
Total ...	...	875	9·83	2,732	19·37	3,154	16·09	1,849	17·16	9,240	60·39
Phanáth ...	I.	...	...	...	...	...	...	...	...	3	·01
	II	...	...	...	...	...	...	...	...	12	·07
	III.	...	...	...	...	...	...	...	...	34	·22
	IV.	...	...	...	...	...	...	...	...	107	·69
Total ...	...	...	...	...	...	...	...	...	...	156	1·01
Ránj ..	I.	513	5·76	297	2·10	749	3·82	346	3·26	648	4·23
	II.	450	5·05	332	2·35	675	3·44	620	5·84	837	5·47
	III.	757	8·50	816	5·78	1,353	6·90	921	8·68	1,593	10·41
	IV.	1,464	16·44	1,506	10·68	3,956	20·18	2,774	26·16	3,122	20·40
Total ...	...	3,184	35·77	2,551	20·92	6,733	34·35	4,661	43·97	6,200	40·52
Ayár ...	I.	1	·01	7	·04	2	·01	1	·01	1	·01
	II.	4	·04	...	...	16	·08	11	·10	17	·11
	III.	33	·37	...	...	211	1·07	99	·93	175	1·14
	IV.	154	1·73	...	...	1,083	5·52	963	9·08	3,132	20·47
Total ...	...	192	2·15	7	·04	1,312	6·69	1,074	10·13	3,325	21·73
Buráns ...	I.	3	·03	...	...	33	·16	26	·24	140	·91
	II.	22	·24	...	...	165	·84	142	1·33	393	2·56
	III.	47	·52	...	..	627	3·19	396	3·73	1,042	6·81
	IV.	150	1·68	2	·01	1,671	8·62	1,288	12 13	4,186	27·35
Total ...	...	222	2·49	2	·01	2,496	12·73	1,850	17·45	5,761	37·65
Miscellaneous ...	I.	9	·10	...	...	12	·06	4	·03	19	·12
	II.	20	·22	1	01	47	·23	6	·05	85	·55
	III.	89	·1	7	·04	163	·83	57	·53	193	1·26
	IV.	533	5·98	140	·99	827	4·21	308	2 90	1,436	9·38
Total ...	...	651	7·31	148	1·04	1,040	5 36	375	3 53	1,733	11·32
Grand Total ...	...	5,124	57·57	5,840	41·41	14,744	75·22	9,809	92 58	26,415	172·64

of the enumeration surveys made :—

Compartment 6, area 260 acres.		Compartment 7, area 67 acres.		Compartment 8, area 101 acres.		Compartment 9, area 91 acres.		Compartment 10, area 53 acres.		Compartment 11, area 108 acres.		Compartment 12, area 98 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
239	·91	41	·61	...	...	161	1·76	32	·60	380	3·51	107	1·09
360	1·38	74	1·10	85	·84	678	7·45	182	3·43	718	6·64	151	1·54
1,666	6·40	396	5·91	637	6·30	668	7·34	262	4·94	1,864	17·25	560	5·71
2,966	11·40	1,536	22·92	3,444	34·09	2,111	2·319	3,508	6·618	7,160	66.29	3,578	36·51
5,231	20·11	2,047	30·55	4,166	41·24	3,618	3·975	3,984	7·516	10,122	93·72	4,396	44·85
...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	·01	...	...	...	...	9	·09	...	...	...	...	...	...
7	·02	2	·02	...	...	34	·37	...	...	...	...	...	...
18	·06	...	...	...	...	81	·89	...	...	...	...	7	·07
29	·11	2	·02	...	...	124	1·36	...	...	...	...	7	·07
48	·18	155	2·31	223	2·20	63	·69	21	·39	29	·26	3	·03
95	·36	107	1·59	288	2·85	86	·94	16	·30	26	·24	6	·06
140	·53	181	2·70	399	3·95	205	2·25	19	·35	184	1·70	25	·25
370	1·42	486	7·25	1,290	12·77	339	3·72	29	·54	202	1·87	28	·28
653	2·51	929	13·86	2,200	21·78	693	7·61	85	1·60	441	4·08	62	·63
...	...	...	...	1	·01	...	...	1	·01	...	...	...	...
6	·02	...	...	4	·03	2	·02	...	...	3	·02	...	...
55	·21	43	·64	26	·25	29	·31	4	·07	45	·41	30	·30
972	3·73	220	3·28	206	2·03	154	1·69	4	·07	292	2·70	290	2·90
1,033	3·97	263	3·92	237	2·34	185	2·03	9	·16	340	3·14	320	3·21
10	·03	28	·41	9	·08	2	·02	...	...	7	·06	...	...
87	·33	76	1·13	27	·26	27	·29	...	...	17	·15	2	·02
125	·48	168	2·50	50	·49	86	·94	...	...	46	·42	25	·25
339	1·30	297	4·43	311	3·07	224	2·46	2	·03	145	1·34	94	·95
561	2·15	569	8·49	397	3·93	339	3·72	2	·03	205	1·99	121	1·23
...	...	6	·08	1	·01	3	·03	...	...	6	·05	...	...
5	·01	21	·31	2	·01	12	·13	1	·01	7	·06	2	·02
12	·04	70	1·04	7	·06	48	·52	1	·01	47	·43	14	·14
168	·64	234	3·49	78	·77	202	2·21	...	...	178	1·64	76	·77
185	·71	331	4·93	88	·87	265	2·92	2	·03	238	2·20	92	·93
7,692	29·58	4,141	61·80	7,088	70·17	5,224	57·40	4,082	77·01	11,356	105·14	4,993	50·94

Species.	Diameter class.	Compartment 13, area 129 acres.		Compartment 14, area 123 acres.		Compartment 15, area 192 acres.		Compartment 16, area 163 acres.		Compartment 17, area 157 acres.	
		Gross number of trees	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	...	...	...	...	316	1·64	126	·82	70	·44
	II.	81	·62	291	2·36	443	2·30	245	1·60	245	1·56
	III.	1,276	9·89	653	5·30	1,898	9·88	834	5·45	1,063	6·77
	IV.	9,904	76·77	5,365	43·53	5,678	29·57	3,948	25·80	6,200	39·49
Total ...	...	11,261	87 29	6,309	51·21	8,335	43·51	5,153	33·68	7,578	48·26
Phanáth ...	I.	...	...	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...	...	...
	III.	...	...	...	...	2	·01	...	...	...	...
	IV.	...	...	1	·01	1	·01	...	...	4	·02
Total ...	...	...	...	1	·01	3	·01	...	...	4	·02
Bánj ...	I.	19	·14	...	...	508	2·64	190	1·24	20	·12
	II.	27	·20	...	...	338	1·76	215	1·40	35	·22
	III.	79	·61	3	·02	598	3·11	389	2·54	33	·21
	IV.	365	2·82	10	·08	1,655	8·61	818	5·34	166	1·05
Total ...	...	490	3·79	13	·10	3,099	16·14	1,612	10·53	254	1·61
Ayár ...	I.	...	...	...	...	11	·05	...	...	...	...
	II.	3	·02	...	...	49	·25	21	·13	11	·07
	III.	39	·30	14	·11	318	1·65	144	·94	75	·47
	IV.	448	3·47	570	...	1,129	5·88	1,077	7·03	586	3·73
Total ...	...	490	3·79	584	4·63	1,507	7·84	1,242	8·11	672	4·28
Buráns ...	I.	2	·01	...	...	280	1·45	36	·23	2	·01
	II.	26	·20	...	...	821	4·27	199	1·30	25	·15
	III.	74	·57	10	·08	1,321	6·88	606	3·96	88	·56
	IV.	320	2·32	62	·50	4,135	21·53	1,633	10·67	217	1·38
Total ...	...	422	3·27	72	·58	6,557	34·15	2,474	16·16	332	2·11
Miscellaneous,	I.	1	·01	...	...	41	·21	3	·01	4	·02
	II.	2	·01	...	...	48	·25	20	·13	5	·03
	III.	21	·16	4	·03	175	·91	87	·56	28	·17
	IV.	113	·87	85	·69	1,041	5·42	367	2·39	64	·40
Total ...	...	137	1·06	89	·72	1,305	6·79	477	3·11	101	·64
Grand Total...	...	12,800	99·22	7,068	57·46	20,806	108·36	10,958	71·62	8,941	56·94

Compartment 18, area 156 acres.		Compartment 19, area 123 acres.		Compartment 20, area 109 acres.		Compartment 21, area 131 acres.		Compartment 22, area 170 acres.		Compartment 23, area 130 acres.		Compartment 24, area 237 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
18	·11	19	·15	13	·11	65	·49	29	·17	50	·38	44	·18
230	1·47	238	1·93	156	1·43	375	2·86	428	2·51	472	3·63	660	2·78
555	3·55	444	3·60	745	6·83	566	4·32	1,134	6·67	1,220	9·38	2,234	94·26
5,270	33·78	3,299	26·82	1,259	11·55	4,982	38·03	7,401	43·53	5,315	40·88	9,824	41·45
6,073	38·92	4,000	32·52	2,173	19·93	5,988	45.71	8,992	52·89	7,057	54·28	12,762	53·84
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	1	·01	...	...	...	...	...	...	...	...	...	...
...	...	1	·01	...	...	...	...	...	...	...	...	...	...
266	1·70	95	·77	416	3·81	5	·03	19	·11	...	...	1	·01
369	2·36	154	1·25	315	2·88	20	·15	13	·07	1	·01	3	·01
544	3·48	207	1·68	615	5·64	26	·19	26	·15	8	·06	10	·04
1,190	7·62	815	6·62	1,091	10·	55	·41	31	·18	6	·04	8	·03
2,369	15·18	1,271	10·33	2,437	22·35	106	·81	89	·52	15	·11	22	·09
4	·02	2	·01	6	·05	1	·01	2	·01	...	...	...	...
17	·10	10	·08	18	·16	6	·04	4	·02	...	...	5	·02
167	1·07	97	·78	297	2·72	32	·24	149	·87	24	·18	34	·14
1,221	7·82	849	6·90	1,508	13·83	160	1·22	2,261	13·3	316	2·43	2,751	11·60
1,409	9·03	958	7·78	1,829	16·77	199	1·51	2,416	14·21	340	2·61	2,790	11·77
44	·28	1	·01	40	·36	...	...	1	·01	1	·01	...	...
148	·94	16	·13	103	·94	4	·03	4	·02	...	...	...	...
479	3·07	67	·54	234	2·14	15	·11	11	·06	2	·01	12	·05
840	5·38	328	2·66	427	3·91	44	·33	70	·41	1	·01	44	·18
1,511	9·68	412	3·34	804	7·37	63	·48	86	·50	4	·03	56	·23
20	·12	9	·07	2	·01	1	·01	...	...	...	...	...	...
86	·55	18	·14	9	·08	8	·06	1	.01	1	·01	...	...
239	1·53	77	·62	127	1·16	22	·16	15	·08	3	·02	2	·01
939	6·01	311	2·52	706	6·47	115	·87	169	·99	32	·24	11	·04
1,284	8·23	415	3·37	844	7·74	146	1·11	185	1·08	36	·27	13	·05
12,646	81·6	7,057	57·37	8,087	74·19	6,502	49·63	11,768	69·22	7,452	57·32	15,643	·66

Species.	Diameter class.	Compartment 25, area 88 acres.		Compartment 26, area 116 acres.		Compartment 27, area 113 acres.		Compartment 28, area 166 acres.		Compartment 29, area 95 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	63	·71	...	...	...	...	...	...	1	·01
	II.	196	2·22	2	·01	1	·01	...	...	34	·35
	III.	744	8·45	2	·01	...	...	1	·01	132	1·38
	IV.	4,578	52·02	34	·29	17	·15	13	·07	162	1·70
Total ...	...	5,581	63·42	38	·32	18	·15	14	·08	329	3·46
Phanáth ...	I.	...	...	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...	...	...
	IV.	...	...	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...	...	...
Bánj ...	I.	4	·04	893	7·69	412	3·64	619	3·72	302	3·17
	II.	8	·09	763	6·57	1,211	10·71	1,736	10·45	527	5·54
	III.	28	·31	1,609	13·87	2,190	19·38	3,536	21·30	1,204	12·67
	IV.	38	·43	4,056	34·96	4,120	36·46	9,304	56·02	1,891	19·90
Total ...	...	78	·88	7,321	63·11	7,933	70·20	15,195	91·54	3,924	41·30
Ayár ...	I.	3	·03	9	·08	1	·01	1	·01	1	·01
	II.	...	...	25	·21	18	·15	7	·04	23	·24
	III.	36	.40	62	·53	71	62	91	·54	162	1·70
	IV.	538	...	591	5.09	626	5·53	1,855	11·17	2,020	21·26
Total ...	...	577	6·11	687	5·91	716	6·33	1,954	11·77	2,206	23·22
Buráns ...	I.	1	·01	51	·43	15	·13	12	·07	12	·12
	II.	3	·03	114	·97	101	·89	72	·43	57	·6
	III.	14	·15	231	1·98	277	2·45	208	1·25	124	1·30
	IV.	23	·26	1,160	10·	553	4·89	536	3·22	154	1·62
Total ...	...	41	·46	1,556	13·41	946	8·37	828	4·98	347	3·65
Miscellaneous	I.	...	...	3	·02	3	·02	3	·01	2	·02
	II.	...	...	2	·01	7	·06	22	·13	14	·14
	III.	...	...	19	·16	53	·46	73	·43	84	·88
	IV.	4	·04	186	1·60	378	3·34	891	5·36	1,123	11·82
Total ...	...	4	·04	210	1·81	441	3·90	989	5·95	1,223	12·87
Grand Total ...	...	6,281	71·37	9,812	84·58	10,054	88·97	18,980	114·33	8,029	84·51

Compartment 30, area 169 acres.		Compartment 31, area 89 acres.		Compartment 32, area 148 acres.		Compartment 33, area 179 acres.		Entire forest, area 4,425 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
86	·50	473	5·31	45	·30	105	·58	3,064	0·69
351	2·07	830	9·32	235	1·58	336	1·87	9,632	2·17
921	5·44	647	7·26	732	4·94	1,144	6·39	26,812	6·05
2,626	15·53	847	9·51	2,668	18·02	7,481	41·79	123,094	27·81
3,984	23·57	2,797	31·42	3,680	24·86	9,066	50·64	162,602	36·74
...	...	...	...	...	...	...	...	3	0·01
...	...	...	...	...	...	...	...	25	0·01
...	...	...	...	...	...	...	...	79	0·01
...	...	...	...	...	...	...	...	220	0·04
...	...	...	...	...	...	...	...	327	0·07
163	·96	...	...	54	·36	1	·01	7,082	1·60
323	1·91	...	...	78	·52	3	·01	9,677	2·18
683	4·04	1	·01	106	·71	10	·05	18,498	4·18
1,405	8·31	2	·02	240	1·62	19	·10	42,851	9·68
2,574	15·23	3	·03	478	3·22	33	·18	78,108	17·65
6	·03	1	·01	1	·01	...	...	63	0·01
33	·19	4	·04	9	·06	1	·01	327	0·07
321	1·89	26	·29	100	67	41	·22	2,050	0·68
1,709	10·11	144	1·61	974	6·58	633	3·53	29,431	6·65
2,069	12·24	175	1·96	1,084	7·33	675	3·77	32,871	7·42
...	...	...	...	3	·02	...	...	759	0·17
7	·04	...	...	4	·02	...	...	2,662	0·60
14	·08	...	...	10	·06	...	...	6,409	1·44
59	·34	...	...	32	·21	7	·03	19,352	4·35
80	·41	...	...	49	·33	7	·03	29,182	6·59
18	10	...	...	2	·01	...	...	172	0·03
43	·25	1	·01	6	·04	...	...	502	0·11
269	1·59	...	...	50	·33	1	·01	2,057	0·46
1,099	6·50	1	04	272	1·83	17	·09	12,104	2·73
1,429	8·45	2	0·02	330	2·23	18	·10	14,835	3·35
10,136	59·77	2,977	33·44	5,021	37·97	9,799	54·74	317,025	71·84

This is without question the best stocked forest of the Ránikhet sub-division and requires only a few years' complete protection to render it a perfect chír forest, with zones of broad-leaved forest, consisting mainly of bánj, fringing and crowning the ridges above 6,200 feet of elevation on northerly exposures and 6,500 feet elsewhere, and bands of the same running down the hillside and lining the deeper ravines.

Reproduction, in spite of the rather heavy grazing and only very recent régime of annual fires, is fairly well advanced. In most places saplings and low poles of chír and bushes of oak according to the elevation and aspect are abundant, but generally in larger or smaller patches, and a sprinkling of young chír seedings, sometimes as close as one on an average to 5 square yards, is met with wherever there is not too much or too little cover.

Fire-conservancy.—The statistics of fire-conservancy since special measures have been undertaken are as follows :—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total.			Cost. Per acre actually protected
						Rs.	a.	p.	Pies.
1879-80	2,560	...	...	...	2,560	50	13	6	5·2
1880-81	2,560	...	...	...	2,560	61	2	2	4·5
1881-82	2,560	10	1	...	2,550	75	7	2	5·6
1882-83	2,560	51	4	...	2,509	129	6	4	9·9
1883-84	2,560	...	...	...	2,560	82	12	9	6·2
1884-85	2,560	...	...	...	2,560	51	1	9	1·8
1885-86	4,425	...	...	...	4,425	46	14	9	3·0
Total ...	19,785	61	5	...	19,724	497	10	5	4·8

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names :—

Name of patti.	Names of villages having rights.	Description of rights. Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghâts.	Limestone.	Bamboos and bâbar.
Malli Doti.	Matela	R	R	R	...	R	...	R	...	..	...	...	..	...	R	...	...	...	...	...	...
Chauthán.	Thapla	R	R	R	R	R	...	R	...	...	...	...	...	...	R	..	...	...	...	...	...
	Dholgaon	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Binkoti	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Chandarkot	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Shonali	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Sunsyari	R	R	R	...	R	..	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Malla Kakláson.	Pantgaon	R	R	R	...	R	..	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Bagdwar	R	R	R	...	R	..	R	R	R	...	...	...	...	R	...	...	R	...	...	...
	Sirmoli	R	R	R	...	R	..	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Bhakunya	R	R	R	...	R	..	R	...	...	...	...	...	..	R	...	...	...	...	...	...
	Mohnari	R	R	R	...	R	...	R	...	...	...	...	...	...	R	..	...	...	...	...	...
	Dharah	R	R	R	...	R	...	R	...	...	...	...	...	..	R	...	...	...	...	...	...
	Gairgaon	R	R	R	...	R	..	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Thawli	R	R	R	...	R	..	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Harnoli	R	R	R	...	R	..	R	...	R	...	...	...	...	R	..	...	...	...	...	...
	Dhanoli Malli	R	R	R	...	R	.	R	...	R	...	...	...	...	R	...	...	...	...	...	...
	Tani	R	R	R	...	R	..	R	...	R	...	...	...	...	R	...	...	...	...	...	..
	Sinowra	...	R	R	...	R	..	R	...	R	...	..	...	...	R	...	...	...	...	...	..
	Sinowra Danywal... ...	...	R	R	...	R	..	R	...	R	...	...	..	...	R	...	...	...	...	...	..
	Dhunoli Talli	...	R	R	...	R	..	R	...	R	...	...	...	...	R	...	...	...	...	...	..

Name of patti.	Names of villages having rights.	Description of rights.																		
		Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for buildings, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghâts.	Limestone.	Bamboos and bâbar.
Malla Kakasan—(*concluded*).	Nougharia	...	R	R	...	R	...	R	...	R	...	...	...	...	R	...	...	...	...	...	...
	Lowkot	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Fulshaw	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Haoli	...	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dumna	...	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Haluli Kathayar	...	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Bhunali	...	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Oogalya	...	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	R
	Rahar	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dumroli	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Karkina	...	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Ringania	R	R	R	...	R	...	R	...	...	...	R	R	...	R	...	...	...	...	...	...
	Bunga Mapalkot	...	R	R	...	R	...	R	R	...	...	...	...	...	...	...	...	...	...	...	...
	Sim	...	R	R	...	R	...	R	R	...	...	...	...	...	...	...	...	...	...	...	...
	Syalkot	...	R	R	...	R	...	R	R	...	...	...	...	...	...	...	...	...	...	...	...
	Micholi	...	R	R	...	R	...	R	R	...	...	...	...	...	...	...	...	...	...	...	...
	Rudbah	R	R	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pali	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Gangora	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Khanoli	...	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Malla Silour.	Surana	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Dudhuli	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Duni	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Janain	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dinga	...	...	...	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...
	Sanni	R	R	R	R	R	...	R	...	...	...	R	...	...	R	...	...	...	R	...	...
	Naphan	R	R	R	...	R	...	R	...	...	...	R	...	...	R	...	...	...	...	...	...
	Pali	R	R	R	R	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pipali	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Sauana	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Namala	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Bhagina	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Sajgori	...	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Bisona	R	R	R	...	R	R	R	...	...	R	...	...	...	R	...	...	R	R	...	...
	Kurkoli	...	...	...	...	R	...	R	...	...	...	...	R	...	R	...	...	...	...	...	...
	Malota	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Ghingaree	R	R	R	...	R	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...
	Sheltana	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dubhana	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pastorápár	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Shekura	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Melkhand	...	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Taua	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Shangura	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Pápará	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Baina	...	...	...	...	R	...	R	R	...	...	...	...	...	R	...	...	...	...	...	...
	Pachkhola	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Bagorah	...	R	R	...	R	...	R	...	R	...	...	R	...	...	...	...	...	...	...	...
	Sawla	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dawra Malla	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Ditto Talla	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Karakat	...	...	...	...	R	...	R	R	...	...	...	...	...	R	...	...	...	...	...	...
Talla Silour.	Sagneti	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Jewra	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kotuli	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Musyakoti	...	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Nawla	R	R	R	...	R	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...
	Haroli	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Miloti	...	R	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chandoligar	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	R	R	...	...	...
	Sainari	R	R	R	...	R	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...
	Katcura Jal	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Majgaon	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Obari	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Gunsar	...	...	...	...	R	...	R	R	...	...	...	...	...	R	...	...	...	...	...	...
	Saloni	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Naugaon	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chowgaon	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kinkhola	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Chamdoli Baman	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Ditto Puranya	R	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Lotna	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Gatoli	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kotyura	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows :—

No.	Name of patti.	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total.
	Talla Silour ...	Soltána	58	4	...	...	62
		Dobhára	164	16	...	32	212
		Raili Bayali ...	58	6	...	8	72
		Bastadowár ...	206	32	...	110	348
		Pipalkot	114	36	...	28	178
		Muiti	116	38	...	64	218
		Simalbhár	210	70	...	112	392
		Kanoli	52	6	...	20	78
		Saginá	96	6	...	18	120
		Lauba	82	46	...	40	168
		Siloni Talli ...	90	8	...	44	142
		Sekurha	118	34	...	76	228
		Tána	274	78	...	26	378
		Sáugura	84	12	...	26	122
		Pákhara	96	6	...	...	102
		Pachklila	16	...	...	8	24
		Koruli	82	4	...	4	90
		Nowla	60	6	...	24	90
		Siauri	72	...	...	...	72
		Dhárbhari	54	2	...	18	74
		Saloni	190	8	...	100	298
		Majgáon	88	20	...	...	108
		Chapdoli Báman ...	34	8	...	20	62
		Ditto Purniya ...	208	16	...	46	270
	Malla Silour ...	Duni	182	8	...	112	302
		Seori	1,200	200	...	64	1,464
		Sana	60	20	...	4	84
		Naphan	304	40	...	166	510
		Ghigari	116	2	...	34	152
	Malla Kakláson,	Sirnoli	244	14	...	12	270
		Bhakunia	38	...	...	14	52
		Mohuari	432	14	...	72	518
		Dhárarh	260	12	...	56	328
		Gairgain	100	6	...	...	106
		Khauli	158	68	...	...	226
		Harnoli	158	8	...	48	214
		Dhanoli Malli ...	134	10	...	10	154
		Táni	186	6	...	...	192
		Laukot	94	10	...	64	168
		Phalsown	272	82	...	...	354
		Bagdwár	142	4	...	58	204
		Rudbow	46	...	...	26	72
	Chauthán ...	Dholgaon	161	12	..	...	173
		Binkot	312	19	...	58	389
		Chandrakot ...	653	14	...	50	717
		Sonuli	214	14	...	57	285
		Thápal	65	21	...	50	136
	Malli Doti ...	Matcha (2nd) ...	34	2	...	34	70
		Total ...	8,187	1,048	...	1,813	11,048
		Average number per acre.	1·85	0·24	...	0·41	2½

As regards trees, the numbers the villagers have actually received on requisition during the past five years are shown in the subjoined statement :—

Forest.	Year.	Chir. Trees.	Chir. Poles.	Oak. Trees.	Oak. Poles.	Miscellaneous. Trees.	Miscellaneous. Poles.	Total. Trees.	Total. Poles.	Grand Total.
Sauni	1881-82	124	1,080	...	389	...	...	124	1,469	1,593
	1882-83	186	994	...	264	...	55	186	1,313	1,499
	1883-84	272	1,764	...	161	...	...	272	1,925	2,197
	1884-85	204	1,520	...	207	...	...	204	1,727	1,931
	1885-86	426	2,115	...	429	2	42	428	2,586	3,014
Total for 5 years ...	...	1,212	7,473	...	1,450	2	97	1,214	9,020	10,234
Average per annum ...	...	242	1,495	...	290	1	19	243	1,804	2,047

From 1871-72, when the forests first came under departmental control, to 1880-81, they were given chír dundárs and bánsas as follows:—

	1871-72.	1872-73	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundárs ...	1,480	508	863	445	1,036	580	250	68	51	46	5,327
Bánsas ...	288	518	765	351	809	1,432	5,484	680	403	976	11,706

Sauni 1.

Boundaries.—North, outside boundary of forest; east, outside boundary of forest and compartment 7; south, outside boundary of forest; west, outside boundary of forest and compartment 4.

Enclosed private estates.—Two small chaks, Sukel Kháta and Chauka, measuring respectively 3·7 and 1 acres.

Area.—89 acres, of which 10 unproductive.

Configuration and aspect.—Steep easterly slopes with gradients varying from 25° to 40°.

Elevation.—Maximum 6,413 feet, minimum 5,220 feet, mean 5,650 feet.

Soil and underlying rock.—Sandy, never deep, though seldom absent, resting on micaceous schists; excellent for bánj and chír.

Stock.—Principally bad bánj coppice, the result of unrestricted lopping. Density 0·25 to 0·5, quality 0·2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	24	1,800	184	8,280	374	7,480	293	2,344	875	19,904
Oaks	513	39,936	450	9,450	757	6,813	1,464	4,392	3,184	57,591
Miscellaneous	13	390	46	644	139	1,112	837	1,674	1,035	3,820
Total ...	550	39,126	680	18,374	1,270	15,405	2,594	8,410	4,094	81,215

Reproduction.—Very backwark, owing to heavy grazing. Mean co-efficient of completeness, 0·1.

Accessibility.—On cart-road, average distance from Ránikhet 15 miles.

Sauni 2.

Boundaries.—North, compartment 3 and outside boundary of forests; east, south, and west, outside boundary of forest.

Area.—141 acres, of which 20 unproductive.

Configuration and aspect.—A long narrow compartment occupying steep slopes which look mostly south.

Elevation.—Maximum 6,216 feet, minimum 5,428 feet, mean 5,900 feet.

Soil and underlying rock.—Soil sandy, very dry, underlying schists; good for mixed chír and bánj.

Stock.—Open, deteriorated crop of chír and bánj. Average density 0·2; quality 0·1.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	101	7,575	436	19,620	799	15,980	1,396	11,168	2,732	54,343
Oaks	297	21,384	332	6,972	816	7,344	1,506	4,518	2,951	40,218
Miscellaneous	7	210	1	14	7	56	142	284	157	564
Total ...	405	29,169	769	26,606	1,622	23,380	3,044	15,970	5,840	95,125

Reproduction.—A fair sprinkling of chír and oak seedlings and saplings, but stunted and unpromising, owing to heavy lopping and grazing.

Accessibility.—On cart-road, average distance from Ránikhet 17 miles.

Sauní 3.

Boundaries.—North and west, boundary of forest (village lands); east, compartment 4; south, compartment 2.

Area.—196 acres, of which 15 unproductive.

Enclosed village lands.—Cultivation Chak Patti Kháta, area 8·3 acres.

Configuration and aspect.—Barring about 40 acres with a westerly exposure, the compartment consists of northerly slopes protected on the north and east by a high ridge and prominent spur respectively. Ruling gradients 25° to 40°.

Elevation.—Maximum 6,216 feet, minimum 4,960 feet, mean 5,900 feet.

Soil and underlying rock.—As in compartment 4.

Stock.—Distribution of species as in compartment 4, but greater density owing to much more abundant low poles of chír. Mean density = 0·6, quality = 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	184	13,800	495	22,275	399	7,980	2,076	16,608	3,154	60,663
Oaks	749	53,928	675	14,175	1,353	12,177	3,956	11,868	6,733	92,148
Miscellaneous	47	1,410	228	3,192	1,001	8,008	3,581	7,162	4,857	19,772
Total ...	980	69,138	1,398	39,642	2,753	28,165	9,613	35,638	14,744	172,583

Reproduction.—Co-efficient of completeness, 0·4. Saplings and low poles of chír and bánj bushes fairly abundant, but new seedlings very scarce owing to heavy grazing.

Accessibility.—One mile of coolie carriage to cart-road, whence 15 miles to Ránikhet.

Sauni 4.

Boundaries.—North, outside boundary of forest; east and south, compartment 1 and outer boundary of forest; west and south, compartment 3.

Area.—106 acres, of which 10 unproductive.

Configuration and aspect.—Fairly rugged and steep slopes drained north-westward into the Dogadda gadhera. Owing to the presence of two large spurs, minor north-easterly and north-westerly aspects occur.

Elevation.—Maximum 6,300 feet, minimum 5,494 feet, mean 5,800 feet.

Soil and underlying rock.—Soil as in 1, but somewhat deeper and moister owing to the aspect.

Stock.—Chír is abundant only on the higher ground and the crest of spurs and ridges, the forest elsewhere being mainly broad-leaved. Mean density 0·5, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	36	2,700	212	9,540	729	14,580	872	6,976	1,849	33,796
Oaks	346	24,912	620	13,020	921	8,289	2,774	8,322	4,661	54,543
Miscellaneous	31	930	159	2,226	552	4,416	2,557	5,114	3,299	12,686
Total ...	413	28,542	991	24,786	2,202	27,285	6,203	20,412	9,809	101,225

Reproduction.—On the whole unsatisfactory owing to heavy grazing. Mean co-efficient of completeness, 0·2.

Accessibility.—Close to 15th milestone from Ránikhet. Average distance of carriage on men's backs to cart-road, ½ mile.

Sauni 5.

Boundaries.—North, the Rikh gád, separating compartment from compartments 7 and 9; east, the Jari gád and a spur separating it from compartment 6; south and west, the outer boundary of the forest.

Area.—153 acres, of which 15 acres unproductive.

Configuration and aspect.—Steep north-easterly slopes, not unfrequently rugged.

Elevation.—Maximum 6,356 feet, minimum 5,700 feet, mean 6,000 feet.

Soil and underlying rock.—Soil sandy, sometimes deep and rich, resting on loose-bedded sandstone and schists and, near the ridge, on limestone; excellent for mixed chír and bánj.

Stock.—A very promising mixed chír and bánj forest, with a large proportion of burans and ayár and other inferior broad-leaved species in the lower moister portions. Average density 0·8, quality 0·8.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	236	17,700	208	9,360	1,513	30,260	7,283	58,264	9,240	1,15,584
Oak	651	46,872	849	17,829	1,627	14,643	3,229	9,687	6,356	89,031
Miscellaneous	160	4,800	495	6,930	1,410	11,280	8,754	17,508	10,819	40,518
Total ...	1,047	69,372	1,052	34,119	4,550	56,183	19,266	85,459	26,415	2,45,133

Reproduction.—Nearly sufficient to fill all gaps and to justify heavy thinnings.

Accessibility.—The compartment extends parallel to the cart-road on the opposite side of the valley. The distance of carriage to Ránikhet will be about one mile on men's backs and 13 miles by cart.

Sauni 6.

Boundaries.—North, the lower course of Rikh gád, separating compartment from compartments 9, 11, and 12, and part of the Kunchgaora gád, separating it from Kathálekh forest; east and south, outer boundary of the forest; west, the Jári gád and a spur separating it from compartment 5.

Area.—260 acres, of which 20 unproductive.

Configuration and aspect.—Broad, open, fairly gentle northerly slopes.

Elevation.—Maximum 6,356 feet, minimum 5,350 feet, mean 5,950 feet.

Soil and underlying rock.—Soil somewhat deeper and richer than in 5.

Stock.—A deteriorated crop, owing to the easy slopes, which invite heavy grazing and lopping. Chír has suffered least.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	239	17,925	360	16,200	1,666	33,320	2,966	23,728	5,231	91,173
Oak	48	3,456	99	2,079	147	1,323	388	1,164	682	8,022
Miscellaneous	10	300	98	1,372	192	1,536	2,958	3,558	1,779	6,166
Total ...	297	21,681	557	19,651	2,005	36,179	6,312	28,450	7,682	1,05,361

Reproduction.—Very backward, owing to the heavy grazing. Mean co-efficient of completeness, 0·2.

Accessibility.—As compartment 5, but one mile less of cart carriage.

Sauni 7.

Boundaries.—North, compartments 26 and 8, east, compartment 9; south, compartment 5 and boundary of forest (site of Riunchi Military Works Bungalow and lands); west, boundary of forest (village lands) and compartment 1.

Area.—67 acres, of which 5 unproductive.

Configuration and aspect.—Southerly, easterly, and north-easterly slopes of 20° to 30° at the head of the Rikh gád, which flows from west to east.

Elevation.—Maximum 6,413 feet, minimum 5,900 feet, mean 6,100 feet.

Soil and underlying rock.—As in compartment 8, but slightly deeper and moister.

Stock.—Older and rather more open than in compartment 8. Quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	41	3,075	74	3,330	396	7,920	1,536	12,288	2,047	26,613
Oaks	155	11,160	107	2,247	183	1,647	486	1,458	931	16,512
Miscellaneous	34	1,020	97	1,358	281	2,248	751	1,502	1,163	6,128
Total ...	230	15,255	278	6,935	860	11,815	2,773	15,248	4,141	49,253

Reproduction.—Mean co-efficient of completeness, 0·2. Small proportion of saplings and low poles of chír conspicuous.

Accessibility.—Compartment traversed by cart-road, 14 miles from Ránikhet.

Sauni 8.

Boundaries.—North, compartments 15 and 13; east, compartment 10; south, compartments 9 and 7 and outer boundary of forest; west, compartment 1 and outer boundary of forest.

Area.—101 acres, of which 10 unproductive.

Configuration and aspect.—Southerly slopes, very steep near the water-shed line, but otherwise fairly uniform and moderately gentle.

Elevation.—Maximum 6,615 feet, minimum 6,100 feet, mean 6,300 feet.

Soil and underlying rock.—Soil sandy, shallow, resting on schists; excellent for mixed chír and oak.

Stock.—Pure chír on the spurs and open slopes; mixed chír and bánj in the gullies. The stock of chír is generally young, most of the large trees having been recently cut out. Average density 0·5, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	...	...	86	3,825	637	12,740	3,414	27,552	4,166	44,117
Oaks	223	16,056	288	6,048	399	3,591	1,290	3,870	2,200	29,565
Miscellaneous	11	330	33	462	83	664	595	1,190	722	2,646
Total ...	234	16,386	406	10,335	1,119	16,995	5,329	32,612	7,088	76,328

Reproduction.—There is a sprinkling of chír saplings and low poles everywhere, except on the very steep ground. Mean co-efficient of completeness, 0·4.

Accessibility.—On the cart-road, less than 14 miles from Ránikhet.

Sauni 9.

Boundaries.—North and east, compartments 10 and 11; south, compartments 6 and 5; west and north, compartments 7 and 8.

Area.—91 acres, of which 6 unproductive.

Configuration and aspect.—The basins of two small feeders of the Rikh gád separated by a prominent spur, both streams and spur trending south-east; hence mainly south-westerly and easterly slopes. Ruling gradients 25° to 35°.

Elevation.—Maximum 6,220 feet, minimum 5,660 feet, mean 5,850 feet.

Soil and underlying rock.—As in compartment 7.

Stock.—The elevation is here rather low for banj; hence mainly a middle-aged chír forest with broad-leaved species in the ravines and deeper gullies. Mean density 0·5, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	161	12,075	678	30,510	668	13,360	2,111	16,888	3,618	72,833
Oaks	63	4,536	95	1,995	239	2,151	420	1,260	817	9,942
Miscellaneous	5	150	41	574	163	1,304	580	1,160	789	3,188
Total ...	229	16,761	814	32,079	1,060	16,815	3,111	19,308	5,224	85,963

Reproduction.—As in compartment 7.

Accessibility.—Immediately below cart-road, 13 miles from Ránikhet.

Sauni 10.

Boundaries.—North and east, watershed line separating compartment from compartment 13 and Dhura Kháta; south, Ránikhet-Rámnagar road separating it from compartments 9 and 11; west, compartment 8.

Area.—53 acres, of which 5 unproductive.

Configuration and aspect.—Steep, fairly uniform southerly slopes.

Elevation.—Maximum 6,384 feet, minimum 5,887 feet, mean 6,150 feet.

Soil and underlying rock.—As in compartment 8, but slightly deeper.

Stock.—Nearly a pure chír forest. Average density 0·7, quality 0·6. The majority of the larger trees have been recently felled.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	32	2,400	182	8,190	262	5,240	3,508	28,064	3,984	43,894
Oaks	21	1,512	16	336	19	171	29	87	85	2,106
Miscellaneous	1	30	1	14	5	40	6	12	13	96
Total ...	54	3,942	199	8,540	286	5,451	3,543	28,063	4,082	46,096

Reproduction.—A very fair sprinkling of chír saplings and small poles everywhere and a little recent reproduction. Mean co-efficient of completeness, 0 4.

Accessibility.—On the cart-road 12½ miles from Ránikhet.

Sauni 11.

Boundaries.—North, compartments 10, 13, and 12; east and south, compartment 6; west, compartment 9.

Area.—108 acres, of which 9 unproductive.

Configuration and aspect.—Principally irregular south-easterly slopes of 20° to 30°, channelled by numerous ravines and gullies running down into the Rikh gád.

Elevation.—Maximum 6,100 feet, minimum 5,375 feet, mean 5,810 feet.

Soil and underlying rock:—As in compartment 7, but less moist; excellent for chír, and for bánj where the altitude is favourable.

Stock.—Mainly a pole forests of chír with larger trees more or less uniformly scattered throughout. Broad-leaved species only along the gád and deeper ravines. Mean density 0·7, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	380	28,500	718	32,310	1,864	37,280	7,160	57,280	10,122	1,55,370
Oaks	29	2,088	26	584	184	1,656	202	606	441	4,896
Miscellaneous	13	390	27	378	138	1,104	615	1,230	793	3,102
Total ...	422	30,978	771	33,272	2,186	40,040	7,917	59,016	11,356	1,63,368

Reproduction.—Mean co-efficient of completeness, 0·6. Principally saplings and low poles.

Accessibility.—Traversed by a bridle-road and just below cart-road, 12 miles from Ránikhet.

Sauni 12.

Boundaries.—North and east, boundary of forests (Kathálekh forests); south, compartment 11; west, compartment 13.

Area.—98 acres, of which 10 unproductive.

Configuration and aspect.—Rugged, often abrupt, north-westerly slopes overhanging the Kunch-garra gád.

Elevation.—Maximum 5,900 feet, minimum 5,375 feet, mean 5,656 feet.

Soil and underlying rock.—Soil sandy, shallow, resting mainly on micaceous schistose sandstone, becoming shingly near the bottom of the slopes, where the rock is conglomeratic; excellent for chír.

Stock.—Principally a chír pole forest with broad-leaved species (chiefly burâns and nyár) scattered here and there throughout. Some pretty heavy fellings were made here about six years ago. Mean density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	107	8,025	151	6,795	560	11,200	3,578	28,624	4,396	54,644
Oaks	3	216	6	126	25	225	35	105	69	672
Miscellaneous	...	...	4	56	69	552	455	910	528	1,518
Total ...	110	8,241	161	6,977	654	11,987	4,068	29,639	4,993	56,834

Reproduction.—Mean co-efficient of completeness, 0·3. Principally young seedings and saplings.

Accessibility.—Just below cart-road, 11½ miles from Ránikhet.

Sauni 13.

Boundaries.—North and west, compartments 14 and 15 and Sauni camping-ground; east, compartment 12; south, compartments 10 and 8 and cultivation Chak Dhura Khet.

Area.—129 acres, of which 7 unproductive.

Configuration and aspect.—Mainly north-easterly slopes of 20° to 30°, forming most of them the broad open basin of a small much-branched feeder of the Kunch-garra gád.

Elevation.—Maximum 5,460 feet, minimum 5,720 feet, mean 6,050 feet.

Soil and underlying rock.—Soil sandy, fairly deep, comparatively rich and moist; excellent for chír and bánj.

Stock.—A young pole forest of chír with broad-leaved trees along the ravines and gullies. Mean density 0·8, quality 0·7. Pretty heavy fellings have recently been made.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	...	...	81	3,645	1,276	25,520	9,904	79,232	11,261	108,397
Oaks	19	1,368	27	567	79	711	365	1,095	490	3,741
Miscellaneous	3	90	31	434	134	1,072	881	1,762	1,049	3,358
Total ...	22	1,458	139	4,646	1,489	27,303	11,150	82,089	12,790	115,496

Reproduction.—There is very little room for any, and that is already pretty well filled up.

Accessibility.—Compartment situated on cart-road, 11 miles from Ránikhet.

Sauni 14.

Boundaries.—North, compartments 16 and 24 and boundary of forest (village lands); east and south, Sauni camping-ground and compartment 13; west, compartment 15.

Area.—123 acres, of which 7 unproductive.

Configuration and aspect.—North-easterly slopes of 20° to 30°.

Elevation.—Maximum 6,200 feet, minimum 5,660 feet, mean 5,900 feet.

Soil and underlying rock.—Soil shallower and drier than in compartment 13; excellent for chír.

Stock.—Principally a young pole forest of chír with chiefly ayár and buráns in the moister places. Mean density 0·5, quality 0·6. Heavy fellings have just been made.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	...	...	291	13,095	653	1,300	5,365	42,020	6,309	69,075
Oaks	...	...	...	...	3	27	11	33	14	60
Miscellaneous	...	...	...	...	28	224	717	1,434	745	1,658
Total ...	...	...	291	13,095	684	13,311	6,093	44,387	7,068	70,793

Reproduction.—Mean co-efficient of completeness, 0·5. Principally seedlings just established or establishing themselves.

Accessibility.—On cart-road, 10½ miles from Ránikhet.

Sauni 15.

Boundaries.—North, compartment 16; east, compartment 14; south, compartments 13 and 8; west, compartment 16.

Area.—181 acres, of which 10 unproductive.

Configuration and aspect.—Mainly north-easterly, with two small stretches of easterly and north-westerly slopes, composing the head-waters of a much-branched feeder of the Kunchgarra gád. Ruling gradients 28° to 35°.

Elevation.—Maximum 6,615 feet, maximum 5,800 feet, mean 6,180 feet.

Soil and underlying rock.—As in compartment 14.

Stock.—On the high easterly slopes just below the main ridge there is a zone of broad-leaved constantly-overlopped forest, consisting chiefly of buráns, bánj, and ayár. Mean density 0·8, quality 0·5. Elsewhere principally chír pole forest. Mean density 0·6, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	316	23,700	443	19,935	1,898	37,960	5,678	45,424	8,335	1,27,019
Oaks	508	36,576	338	7,098	598	5,382	1,655	4,965	3,099	54,021
Miscellaneous	332	9,960	918	12,852	1,814	14,512	6,505	12,610	9,369	49,934
Total ...	1,156	70,236	1,699	39,885	4,310	57,854	13,638	62,999	20,803	2,30,974

Reproduction.—Mean co-efficient of completeness, 0·6. All classes of advance growth, including a very large proportion of completely established seedlings of chír.

Accessibility.—About ¾ mile above Brewery cart-road, 10¾ miles from Ránikhet.

Sauni 16.

Boundaries.—North, compartment 16; east, compartment 14; south, compartment 8; west, compartment 26.

Area.—153 acres, of which 8 unproductive.

Configuration and aspect.—The basin of a much-branched, eastward-flowing feeder of the Kunchgarra gád, comprising slopes of various aspects, working round from north to east and thence south, but among which northerly and easterly exposures predominate. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,470 feet, minimum 5,610 feet, mean 6,050 feet.

Soil and underlying rock.—Soil sandy, shallow, but fertile, resting on mica schists; excellent for chír and bánj.

Stock.—Very much as in compartment 15, but owing to lower mean elevation the proportion of broad-leaved forests is smaller and that of chír larger.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	126	9,450	245	11,025	834	16,680	3,948	31,584	5,153	68,739
Oaks	190	13,680	215	4,515	389	3,501	818	2,454	1,612	24,150
Miscellaneous	39	1,170	240	3,360	837	6,696	3,077	6,154	4,193	17,380
Total ...	355	24,300	700	18,900	2,060	26,877	7,843	40,192	10,958	110,269

Reproduction.—Mean co-efficient of completeness, 0·7. Established seedlings are very numerous and vigorous, and all blanks are more or less rapidly filling up in spite of the grazing.

Accessibility.—On Brewery cart-road, 11½ miles from Ránikhet.

Sauni 17.

Boundaries.—North, compartments 18 and 21; east, compartment 24; south, compartment 16; west, compartment 26.

Area.—157 acres, of which 10 unproductive.

Configuration and aspect.—Mainly irregular, north-easterly slopes, channelled by a great many ravines and gullies. Ruling gradients 15° to 30°.

Elevation.—Maximum 6,454 feet, minimum 5,700 feet, mean 6,100 feet.

Soil and underlying rock.—Soil shallower and drier than in compartment 16; excellent for chír and bánj.

Stock.—Owing to the more exposed aspect than in compartment 16, principally a young pole chír forest, with a fringe of broad-leaved species near the top of the main ridge and along the deeper ravines. Mean density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—Class I.		Girth—Class II.		Girth—Class III.		Girth—Class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	70	5,250	245	11,025	1,063	21,260	6,200	49,600	7,578	87,135
Oaks	20	1,440	35	735	33	297	170	510	258	2,982
Miscellaneous	6	180	41	574	191	1,528	867	1,734	1,105	4,016
Total ...	96	6,870	321	12,334	1,287	23,085	7,237	51,844	8,941	94,143

Reproduction.—As in compartment 16.

Accessibility.—On Brewery cart-road, 11½ miles from Ránikhet.

Sauni 18.

Boundaries.—North, compartment 19; east, compartment 21; south, compartment 17; west, compartments 26 and 27,

Area.—156 acres, of which 10 unproductive.

Configuration and aspect.—As in compartment 17, but more exposed to the north.

Elevation.—Maximum 6,454 feet, minimum 5,800 feet, mean 6,150 feet.

Soil and underlying rock.—As in compartment 16.

Stock.—Broad-leaved forest near the top, where elevation is too high for chír; elsewhere mainly young pole forest of chír, with buráns and ayár scattered throughout. Mean density 0·7, quality 0·6.

Summary of valuation.

Species.	Girth—Class I.		Girth—Class II.		Girth—Class III.		Girth—Class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	18	1,350	230	10,350	555	11,100	5,270	42,160	6,073	64,960
Oaks	266	19,152	369	7,749	544	4,896	1,190	3,570	2,369	35367
Miscellaneous	68	2,040	251	3,514	885	7,080	3,000	6,000	4,204	18,634
Total ...	352	22,542	850	21,613	1,984	23,076	9,460	51,730	12,646	118,961

Reproduction.—Mean co-efficient of completeness, 0·6. Saplings and low poles are abundant and new seedlings are fast filling up the existing small blanks.

Accessibility.—Less than a mile further up the valley than the Brewery, which is 11¼ miles from Ránikhet.

Sauni 19.

Boundaries.—North, compartment 23; east, compartments 22 and 21; south, compartment 18; west, compartments 18, 27, and 28.

Area.—123 acres, of which 10 unproductive.

Configuration and aspect.—Mainly regular easterly slopes, slightly inclined to north and channelled by several more or less parallel ravines and gullies. Ruling gradients 20° to 33°, but many very easy slopes occur.

Elevation.—Maximum 6,500 feet, minimum 5,857 feet, mean 6,200 feet.

Soil and underlying rock.—As in compartment 16.

Stock—Similar to that in compartment 18, but youngest girth-class not so well represented: hence density only 0·6 and quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	19	1,425	238	10,710	444	8,880	3,299	26,392	4,000	47,407
Oaks	95	6,840	154	3,234	207	1,863	816	2,448	1,272	14,385
Miscellaneous	12	360	44	616	241	1,928	1,488	2,976	1,785	5,880
Total ...	126	8,625	436	14,560	892	12,671	5,603	31,816	7,057	67,672

Reproduction.—Mean co-efficient of completeness, 0·5. Low poles and saplings are not numerous, but young seedlings are rapidly filling up all old cultivation sites and other blanks.

Accessibility.—About one mile of coolie carriage to Brewery, whence 11¼ miles by cart to Ránikhet.

Sauni 20.

Boundaries.—North, compartments 29, 31, and 33: east, compartment 22; east and south, compartments 21 and 19; west, compartment 28.

Area.—109 acres, of which 7 unproductive.

Configuration and aspect.—The head of the main stream of the Kunchgarra gád, a deep hollow basin with numerous converging ravines. Every aspect but westerly ones are represented, but northerly and easterly outlooks predominate. Ruling gradients 20° to 30.°

Elevation.—Maximum 6,512 feet, minimum 6,043 feet, mean 6,320 feet.

Soil and underlying rock.—On the lower slopes mainly a young pole forest of chír; above, broad-leaved forest, in which the oak is stunted and gnarled from often-repeated lopping. Mean density 0·6, quality 0·4.

Stock.—As in compartment 16.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	13	975	156	7,020	745	14,900	1,259	10,072	2,173	32,967
Oaks	416	29,952	315	6,615	615	5,535	1,091	3,273	2,437	45,375
Miscellaneous	48	1,440	130	1,820	658	5,264	2,641	5,282	3,477	13,806
Total ...	477	32,367	601	15,455	2,018	25,699	4,991	18,627	8,087	92,148

Reproduction.—Mean co-efficient of completeness, 3·6. Saplings and low poles and coppice bushes are abunbant, and seedlings of chír are also rapidly taking possession of the ground in open places on the lower slopes.

Accessibility.—About two miles of coolie carriage to Brewery, whence 11¼ miles by cart to Ránikhet.

Sauni 21.

Boundaries.—North, compartment 22 ; east, compartment 23 and Brewery site ; south and west, compartments 17, 18, and 19.

Area.—131 acres, of which 7 unproductive.

Configuration and aspect.—Principally regular south-westerly slopes of 20° to 30°, overhanging the Kunchgarra gád and furrowed by numerous more or less parallel ravines and gullies.

Elevation.—Maximum 6,270 feet, minimum 5,763 feet, mean 5,950 feet.

Soil and underlying rock.—As in compartment 17.

Stock.—Principally chír pole forest with broad-leaved individuals, generally in the shape of bushes or pollards, scattered throughout. Barring a few blanks, the mean density is 0·5, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	65	4,875	375	16,875	566	11,320	4,982	39,856	5,988	72,926
Oaks	5	360	20	420	26	234	55	165	106	1,179
Miscellaneous	2	30	18	252	69	552	319	638	408	1,502
Total ...	72	5,265	413	17,547	661	12,106	5,356	40,659	6,602	75,607

Reproduction.—Co-efficient of completeness, 0·3. Older advance growth in places and a sprinkling of young seedlings in open spots.

Accessibility.—Compartment touches at one extremity the Brewery, whence 11¼ miles by cart to Ránikhet.

Sauni 22.

Boundaries.—North, compartment 33 and boundary of forest (village lands); east, boundary of forest (village lands); south, compartments 23 and 21; west, compartments 19, 20, and 31.

Area.—170 acres, of which 10 unproductive.

Configuration and aspect.—Slopes of 15° to 30° on both sides of the main stream of the Kunchkgarra gád just below compartment 20 and forming a deep narrow valley running west and east. About two-thirds of the compartment have a northerly outlook; the remaining slopes face either south or south-west.

Elevation.—Maximum 6,245 feet, minimum 5,850 feet, mean 6,020 feet.

Soil and underlying rock.—As in compartment 16.

Stock.—Mainly a young pole forest of chír with numerous low ayár scattered throughout. The northern slopes are the best wooded. Mean density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	29	2,175	428	19,260	1,134	22,680	7,401	59,208	8,992	103,323
Oaks	19	1,368	13	273	26	234	31	93	89	1,968
Miscellaneous	3	90	9	126	175	1,400	2,500	5,000	2,687	6,616
Total ..	51	3,633	450	19,659	1,335	24,314	9,932	64,301	11,668	111,907

Reproduction.—Mean co-efficient of completeness, 0·5. Saplings and low poles abound and chír seedlings are pretty numerous in the blanks.

Accessibility.—A little more than a mile of coolie carriage down to Brewery, whence 11¼ miles to Ránikhet.

Sauni 23.

Boundaries.—North, compartment 22; east and south, boundary of forest (village lands) and compartments 25 and 24; west, compartment 21.

Area.—130 acres, of which 8 unproductive.

Configuration and aspect.—Half the area comprises south-easterly slopes overhanging the Kunchgarra gád. The remainder consists of the deep basin of a small feeder, flowing nearly due east, of the same gád, and comprises north-easterly and southerly slopes. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,276 feet, minimum 5,800 feet, mean 6,050 feet.

Soil and underlying rock.—Soil sandy, fairly deep in the ravines and on easy slopes; elsewhere rather shallow, resting on micaceous schistose sandstone; excellent for chír.

Stock.—Essentially a promising chír pole forest distributed in large groups, the sites of former cultivation, and sprinkled throughout with low ayár. Mean density 0·5, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chir	50	3,750	472	21,240	1,220	24,400	5,315	42,520	7,057	91,910
Oaks	...	...	1	21	8	72	6	18	15	111
Miscellaneous	1	30	1	14	29	232	349	698	380	974
Total ...	51	3,780	474	21,275	1,257	24,704	5,670	43,236	7,452	92,995

Reproduction.—Co-efficient of completeness, 0·4 ; a great lack of recent seedlings.

Accessibility.—As for compartment 21.

Sauni 24.

Boundaries.—North-east, compartment 25 ; south-east, boundary of forest (Sauni village) ; south-west, compartments 14, 16, and 17 ; north-west, compartments 21 and 23.

Area.—237 acres, of which 14 unproductive.

Configuration and aspect.—The compartment occupies two separate stream basins separated by a spur running down south-west, and at the foot of which the Brewery is situated. North-westerly slopes comprise a little more than half the area. The remaining slopes look either west or south. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,283 feet, minimum 5,700 feet, mean 5,950 feet.

Soil and underlying rock.—As in compartment 23.

Stock.—As in compartment 22.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chir ...	44	3,300	660	29,700	2,234	44,680	9,824	78,592	12,762	1,56,272
Oaks	1	72	3	63	10	90	8	24	22	249
Miscellaneous	...	...	5	70	48	384	2,806	5,612	2,859	6,066
Total ...	45	3,372	668	29,833	2,292	45,154	12,638	84,228	15,643	1,62,587

Reproduction.—As in compartment 22, but slightly deteriorates above Banagaon.

Accessibility.—On Brewery cartroad, 11 miles from Ránikhet.

Sauni 25.

Boundaries.—North, compartment 23 and boundary of forest (village lands) ; east and south, boundary of forest (village lands) ; west and south, boundary of forest (village lands) and compartments 24 and 23.

Area.—88 acres, of which 6 unproductive.

Configuration and aspect.—North-easterly and north-westerly slopes forming the head of a small stream running north, together with a long sweep of easterly slopes above the village of Dábar. Ruling gradients 25° to 35° with several scarps.

Elevation.—Maximum 6,283 feet, minimum 5,815 feet, mean 6,080 feet.

Soil and underlying rock.—Soil shallow and more stony than in compartment 23; excellent for chír.

Stock.—Mainly a pole forest of chír with a few ayár scattered throughout. The crop is youngest on the north-westerly and north-easterly slopes, where the mean density is very nearly 0·7. Density on easterly slopes 0·4; mean co-efficient of quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	63	4,725	196	8,820	744	14,880	4,578	36,624	5,581	65,049
Oaks	4	288	8	168	28	252	38	114	78	822
Miscellaneous	4	120	8	42	50	400	565	1,130	622	1,692
Total ...	71	5,133	207	9,030	822	15,532	5,181	37,868	6,281	67,563

Reproduction.—Mean co-efficient of completeness, 0·7. All classes of advance growth.

Accessibility.—About ¾ mile of coolie carriage to a point on cart-road, 10 miles from Ránikhet.

Sauni 26.

Boundaries.—North, compartments 27 and 18; east, compartments 17, 16, 15, and 8; south and west, boundary of forest (village lands).

Area.—116 acres, of which 6 unproductive.

Configuration and aspect.—A long continuous sweep of south-westerly and westerly slopes of 20° to 40,° with numerous scarps near ridge.

Elevation.—Maximum 6,615 feet, minimum 6,103 feet, mean 6,380 feet.

Soil and underlying rock.—Soil fairly rich and moist, but shallow and often exposing the underlying micaceous schistose sandstone; excellent for bánj, and also for chír if elevation were not too great.

Stock.—Principally a forest of bánj interpersed with buráns and ayár; none of the bánj of any great height owing to constant lopping. Mean density 0·75, quality 0·5. Brushwood abundant.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	...	..	2	90	2	40	34	272	38	·302
Oaks	893	64,296	763	16,023	1,609	14,481	4,056	12,168	7,321	1,06,968
Miscellaneous	63	1,890	141	1,074	312	2,496	1,937	3,874	2,453	10,234
Total ...	966	66,186	904	18,087	1,923	17,017	6,027	16,314	9,812	1,17,504

Reproduction.--Co-efficient of completeness, 0·6. Principally bushes and low pollards.

Accessibility.—About two miles of coolie carriage down to cart-road, 10½ miles from Ránikhet.

Sauni 27.

Boundaries.—North, compartment 28; east, compartments 19 and 18; south, compartment 26; west, boundary of forest (village lands).

Area.—113 acres, of which 7 unproductive.

Configuration and aspect.—Westerly slopes of 20° to 30°, with a few scarps below main ridge and furrowed by several deep ravines and gullies.

Elevation.—Maximum 6,454 feet, minimum 5,740 feet, mean 6,090 feet.

Soil and underlying rock.—As in compartment 26.

Stock.—As in compartment 26.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	...	...	1	45	...	...	17	136	18	181
Oaks	412	29,664	1,211	25,431	2,190	19,710	4,120	12,360	7,933	87,165
Miscellaneous	19	570	126	1,764	401	3,208	1,557	3,114	2,103	8,656
Total ...	431	30,234	1,338	27,240	2,591	22,918	5,694	15,610	10,054	96,002

Reproduction.—As in compartment 26.

Accessibility.—About two miles of coolie carriage down to Brewery, whence 11¼ miles by cart to Ránikhet.

Sauni 28.

Boundaries.—North and west, boundary of forests (village lands); north-east, compartments 29, 20, and 19; south, compartment 27.

Area.—166 acres, of which 10 unproductive.

Configuration and aspect.—Principally south-westerly slopes of same gradient and contours as in compartment 27.

Elevation.—Maximum 6,512 feet, minimum 5,730 feet, mean 6,100 feet.

Soil and underlying rock.—As in compartment 27.

Stock.—Very much like that of compartment 26, except that the trees are, as a rule, rather smaller; there is less brushwood on the ground.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chir	...	...	...	...	1	20	13	104	14	124
Oaks	619	44,568	1,736	36,456	3,536	21,824	9,304	27,912	15,195	1,40,760
Miscellaneous	16	480	101	1,414	372	2,976	3,272	6,544	3,761	11,414
Total ...	635	45,048	1,887	37,870	3,909	34,820	12,589	34,560	18,970	1,52,298

Reproduction.— As in compartment 27.

Accessibility.—About 2½ miles of coolie carriage down to Brewery, whence 11½ miles by cart to Ránikhet.

Sauni 29.

Boundaries.—North, compartment 30; east, compartments 31 and 20; south, compartment 30; south and west, compartment 28 and boundary of forest (village lands).

Area.—95 acres, of which 6 unproductive.

Configuration and aspect.—Northerly slopes of 20° to 30°, forming the head of the basin of the Baiala gád.

Elevation.—Maximum 6,417 feet, minimum 5,900 feet, mean 6,150 feet.

Soil and underlying rock.—As in compartment 26.

Stock.—Owing to the diminished altitude chír makes its appearance on the lower slopes, usually mixed with banj and ayár. Elsewhere the crop resembles that in compartment 28, but with less banj and more ayár. Mean density 0·75, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	1	775	34	1,530	132	2,640	162	1,296	329	5,541
Oaks	302	21,744	527	11,067	1,204	10,836	1,891	5,673	3,924	48,320
Miscellaneous	15	450	94	1,316	370	2,960	1,497	2,994	1,976	7,720
Total ...	318	22,269	655	13,913	1,706	16,436	3,550	9,963	6,229	61,581

Reproduction.—Co-efficient of completeness, 0·6.

Accessibility.—About ½ mile more of coolie carriage than from compartment 28.

Sauni 30.

Boundaries.—North and west, boundary of forest (village lands); east, compartments 32 and 31; south, compartment 29.

Area.—169 acres, of which 8 unproductive.

Configuration and aspect.—Principally northerly and westerly slopes of 18° to 35°, forming the deep basin of a much-branched stream sweeping round in a curve from south to west.

Elevation.—Maximum 6,180 feet, minimum 5,400 feet, mean 5,780 feet.

Soil and underlying rock.—Soil sandy, free, shallow, often exposing the underlying crumbling micaceous sandstone; excellent for chír and bánj.

Stock.—Broad-leaved forest, composed principally of bánj and ayár along and below the high ridge enclosing the basin and running down the ravines and deeper gullies; elsewhere chír pole forests with some scattered ayár. Mean density 0·5, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	86	6,450	351	15,796	921	18,420	2,626	21,008	3,984	61,673
Oaks	163	11,736	323	6,783	683	6,147	1,405	4,215	2,574	28,881
Miscellaneous	24	720	83	1,162	604	4,832	2,867	5,734	3,578	12,448
Total ...	273	18,906	757	23,740	2,208	29,399	6,898	30,957	10,136	1,03,002

Reproduction.—Mean co-efficient of completeness, 0·4. All classes of advance growth, mainly in patches.

Accessibility.—About three miles of coolie carriage down to Brewery, whence 11¼ miles by cart to Ránikhet.

Sauni 31.

Boundaries.—North, compartment 32; east, compartments 33 and 22; south, compartment 20; west, compartments 29 and 30.

Area.—89 acres, of which 6 unproductive.

Configuration and aspect.—North-easterly and westerly slopes of 20° to 30,° composing the left side of the head of the basin of the Banjaghát gadhera, which runs out north.

Elevation.—Maximum 6,200 feet, minimum 5,500 feet, mean 5,900 feet.

Soil and underlying rock.—As in compartment 30.

Stock.—Principally middle-aged and even old chír. Mean density 0·4, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	473	35,475	830	37,350	647	12,940	847	6,776	2,797	92,541
Oaks	...	...	...	...	1	9	2	6	3	15
Miscellaneous	1	30	5	70	26	208	145	290	177	598
Total ...	474	35,505	835	37,420	674	13,157	994	7,072	2,977	93,154

Reproduction.—Mean co-efficient of completeness, 0·3; principally recent seedlings.

Accessibility.—Slightly easier than for compartment 30.

Sauni 32.

Boundaries.—North, boundary of forest (village lands); east, compartment 33, south, compartment 81; west, compartment 30.

Area.—148 acres, of which 10 unproductive.

Configuration and aspect.—Principally north-easterly and northerly slopes of 20° to 30°, drained directly into the Banjaghát gadhera by numerous-branched ravines and gullies..

Elevation.—Maximum 5,925 feet, minimum 5,126 feet, mean 5,500 feet.

Soil and underlying rock.—As in compartment 30.

Stock.—Owing to lower elevation the zone of broad-leaved forest is more limited than that in compartment 30; otherwise the stock here is the same as in that compartment. Mean density 0·4, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	45	3,375	235	10,575	732	14,640	2,668	21,344	3,680	49,934
Oaks	54	3,888	78	1,638	106	954	240	720	478	7,200
Miscellaneous	6	180	19	266	160	1,280	1,278	2,556	1,463	4,282
Total ...	105	7,343	332	12,479	998	16,874	4,186	24,620	5,621	61,416

Reproduction.—Mean co-efficient of completeness, 0·4. All classes of advance growth, but principally young seedlings.

Accessibility.—Just over three miles of coolie carriage down to Brewery, whence 11¼ miles by cart to Ránikhet.

Sauni 33.

Boundaries.—North and east, boundary of forest (village lands); south, compartments 22 and 20; west, compartments 31 and 32.

Area.—179 acres, of which 14 unproductive.

Configuration and aspect.—Mainly north-westerly and northerly slopes of 25° to 35°, not unfrequently scarped, and for the most part overhanging the Banjaghát gadhera.

Elevation.—Maximum 6,245 feet, minimum 5,126 feet, mean 5,820 feet.

Soil and underlying rock.—Soil drier and shallower than in compartment 30; excellent for chír.

Stock.—Principally young pole forest of chír. Mean density 0·4, quality 0·4. There are many blanks.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	105	7,875	336	15,120	1,144	22,830	7,481	59,848	9,066	105,723
Oaks	1	72	3	63	10	90	19	57	33	282
Miscellaneous	...	...	1	14	42	336	657	1,314	700	1,664
Total ...	106	7,947	340	15,197	1,196	23,306	8,157	61,219	9,799	107,669

Reproduction.—Co-efficient of completeness, 0·2. A sprinkling of young seedlings everywhere ; saplings and low poles only in patches on lower slopes.

Accessibility.—As for compartment 32.

CHAPTER II.—THE SIÚN FORESTS.

Situation and boundaries.—This forest lies between 29°-34′-48″ and 29-°36′-14″ north latitude and 79°-24′-6″ and 79°-25′-58″ east longitude. It is situated almost entirely in Patti Malli Doti, pargana Páli Pachháon, only 74 acres crossing the ridge into Patti Chauthán Kosia in pargana Dhaniákot. It is surrounded on all sides by village lands. Its average distance is about 10 miles from Ránikhet and 5 miles from the Rámnagar-Ránikhet cart-road.

Area.—727 acres, of which 65 unproductive.

Number of compartments.—9.

Topography.—The forest extends over the northern slopes of the Dhania main ridge, with the exception of 74 acres, forming compartment 6, which crosses over to the southern face, which at that place is very much steeper than the other face. This latter consists of northerly slopes with rounded spurs and generally shallow ravines and gullies. The gradients seldom exceed 40° and average only 30°.

Elevation.—Maximum 6,688 feet, minimum 5,158 feet, mean 6,100 feet.

Soil and underlying rock.—The hill is composed of similar sandstone to that forming the Kathálekh hill. The soil is hence also similar, but, owing to the greater elevation and prevailing northerly aspects, the large proportion of oaks and other broad-leaved trees growing thereon have enriched it with their dead leaves.

Stock.—The following statement is an abstract of the results of the enumeration survey of the stock :—

Species.	Diameter-class.	Compartment 1, area 62 acres.		Compartment 2, area 69 acres.		Compartment 3, area 136 acres.		Compartment 4, area 62 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	30	·48	28	·40	911	6·69	94	1·52
	II.	56	·90	35	·50	425	3·14	163	2·63
	III.	585	9·43	224	3·24	553	4·07	616	9·94
	IV.	2,655	42·82	1,368	19·82	3,007	22·11	1,484	23 94
Total ...	...	3,326	53·65	1,655	23·98	4,896	36·00	2,357	38·02
Phanáth	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	1	·01	...	...	5	0·04	1	0·2
	IV.	1	·01	...	...	9	0·07	8	0·13
Total ...	...	2	·03	...	...	14	0 10	9	0·15
Báuj	I.	161	2·60	154	2·23	39	0·29	67	1·08
	II.	271	4·37	195	2·82	26	0·12	92	1·48
	III.	391	6·30	337	4·88	64	0·47	123	1·98
	IV.	798	12·87	709	10·28	180	1·32	374	6·03
Total ...	...	1,621	26·14	1,395	20·21	309	2·20	656	10·58
Ayár	I.	1	·01	2	·02	...	...	...	.
	II.	6	·09	4	·06	5	0·04	1	0·02
	III.	39	·63	32	·46	42	0·31	23	0·37
	IV.	457	7·37	460	6·66	653	4·30	278	4·48
Total ...	...	503	8·11	498	7·21	700	5·15	302	4·87
Burána	I.	47	·75	48	·69	2	0·01	15	0·24
	II.	133	2·14	95	1·37	49	0·38	34	0·55
	III.	318	5·13	191	2·76	75	0·55	62	1·00
	IV.	600	9·67	906	13.13	271	1·99	654	10·55
Total ...	...	1,098	17·70	1,240	17·07	404	2·97	765	12·34
Miscellaneous	I.	...	...	...	..	1	0·01	1	0·02
	II.	2	·03	3	·04	1	0·01	1	0·02
	III.	10	·16	38	·55	20	0·15	21	0·34
	IV.	98	1·58	248	3·60	103	0·76	105	1·69
Total ...	...	110	1·77	289	4·19	125	0·92	128	2·06
Grand Total ...	...	6,660	107·42	5,077	73·58	6,448	47·41	4,217	68·02

Compartment 5, area 130 acres.		Compartment 6, area 74 acres.		Compartment 7, area 74 acres.		Compartment 8, area 71 acres.		Compartment 9, area 50 acres.		Entire forest, area 727 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
99	0·76	...	...	11	0·15	11	0·15	5	0·10	1,189	1·63
200	1·54	...	...	88	1·19	45	0·63	92	1·80	1,104	1·51
1,473	11·33	1	·01	201	2·72	278	3·91	462	9·24	4,393	6·04
2,390	18·38	5	0·7	261	3·52	473	6·66	487	9·74	12,130	16·68
4,162	32·02	6	0·8	561	7·58	807	11·36	1,046	20·92	18,816	25·88
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	7	·01
...	...	...	...	...	...	2	0·02	...	...	20	·02
...	...	...	...	...	...	2	0·02	...	...	27	·03
614	4·72	407	5·50	165	2·23	174	2·45	243	4·86	2,024	2·78
503	3·87	580	7 84	301	4·06	198	2·78	166	3 32	2,332	3·20
1,141	8·77	1,361	18·39	505	6·82	331	4·66	239	4·78	4,402	6·17
2,342	18·02	1,164	15·73	620	8·37	533	7·53	699	13·98	7,421	10·20
4,600	35 38	3,512	47·45	1,591	21·50	1,238	17·43	1,347	26·94	16,269	22·37
3	0·02	...	...	...	...	...	...	1	0·02	7	·01
18	0·15	...	...	...	...	1	0·01	12	0·24	47	·06
183	1·41	1	·01	32	0·43	22	0·30	40	0·80	414	·57
1,690	13·00	10	·13	222	3·00	211	2·97	315	6 30	4,296	5·90
1,894	14·57	11	·14	254	3·43	234	3·29	368	7·36	4,764	6 55
186	1·43	1	·01	20	0·27	15	0·21	32	0·64	373	·51
254	1·95	2	·02	59	0·79	68	0·96	72	1·44	766	1·05
621	4·77	4	·05	87	1·18	105	1·48	138	2·76	1,601	2·20
2,704	2·80	12	·16	441	5·96	545	7·68	935	18·70	7,068	9·72
3,765	28·96	19	·25	607	8·20	733	10·32	1,177	23·54	9,808	13·49
4	0·03	...	...	1	0·01	...	...	...	...	7	·01
14	0·10	...	...	1	0·01	2	0·03	5	0·10	29	·04
80	0·61	5	·07	7	0·09	9	0·13	55	1·10	245	·33
495	3·81	53	·71	67	0·90	111	1·56	272	5·44	1,552	2·13
593	4·56	58	·78	76	1·02	122	1·72	332	6·64	1,833	2·52
15,014	115·49	3,606	48·74	3,089	41·74	3,136	44·16	4,270	85·40	51,517	70·86

This forest contains all the elements for the making of an excellent mixed chír and bánj forest. The portions immediately under the main ridge are apparently too high for chír, but from the point of view of protection from adverse influences this circumstance is rather an advantage. The crop, especially the pine portion, is on the whole young and is very promising.

Reproduction, in spite of the heavy grazing, is in a comparatively satisfactory condition. More or less large groups of saplings and poles of chír are scattered everywhere below 6,200 feet, and recent seedlings of this species also sprinkle the ground in most places. Heavily coppiced and pollarded oak is also abundant, but new reproduction is naturally prevented by the grazing.

Fire-conservancy.—The statistics of fire-conservancy, since special measures have been undertaken, are as follows :—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost.	
						Total.	Per acre actually protected.
						Rs. a. p.	
1884-85	727	...	...	...	727	11 15 0	3·1
1885-86	727	..	..	...	727	11 13 3	3·1
Total ...	1,454	...	...	...	1,454	23 12 3	3·1

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names :—

Name of patti.	Names of villages having rights.	Description of rights.																		
		Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghats.	Limestone.	Bamboos and bíbar.
Dhurapat	Haldyani	...	..	...	...	R	..	R	...	...	...	...	...	...	...	..	...	...	...	...	...
Malli Doti	Shim Talla	R	R	R	...	R	...	R	...	...	...	..	...	...	...	...	...	...	...	...	...
	Shiswa	R	R	R	.	R	...	R	...	...	...	..	...	...	R	...	...	...	...	...	...
	Telgaon	B	R	R	...	R	.	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Shima	R	R	R	...	R	...	R	...	...	...	..	...	...	R	...	...	...	...	...	...
	Noughar	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	..	...
	Woony	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Matela	R	R	R	...	R	...	R	...	.	...	...	...	...	R	...	...	...	...	...	...
	Jaina . ..	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	..	...	...	...	...
	Gumta	R	R	R	.	R	..	R	...	...	...	...	...	..	R	...	...	...	...	...	...
	Siún Malla ...	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	..	...	...	...	...
	Do. Talla	R	R	R	..	R	...	R	...	...	...	...	...	...	R	...	..	...	...	...	...
	Kothar	R	R	R	...	R	..	R	..	...	...	...	...	...	R	...	...	...	...	...	...
	Thakulari	R	R	R	R	R	...	R	..	R	...	...	...	...	R	...	...	...	...	...	...
Chauthán	Sunsyar	R	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	..	...
	Digthar	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows:—

Number.	Name of patti.	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total.
	Malli Doti	Sisyán ..	86	...	...	2	88
		Shima ...	48	...	...	20	68
		Telgaon ...	86	12	...	10	108
		Sia Talla ..	58	4	...	36	98
		Nonghar ...	128	...	...	30	158
		Ooni ...	124	10	...	62	196
		Jaina ...	146	6	...	94	246
		Gumta ...	134	4	...	98	236
		Siún Malla ...	76	...	...	14	90
		Do. Talla ...	142	16	...	66	224
		Kotar ...	70	6	...	...	76
		Thakulari ...	138	2	...	62	202
		Matela (2nd) ...	34	2	...	34	70
	Chauthán ...	Sunsyári .	163	3	...	...	169
		Digthari ...	80	29	...	...	106
			1,513	94	...	528	2,135
		Average number per acre.	2·1	0·17	...	0·77	2·9

As regards trees, the numbers the villages in question have actually received on requisition during the past five years are shown in the subjoined statement:—

Forest.	Year.	Chir. Trees.	Chir. Poles.	Oak. Trees.	Oak. Poles.	Miscellaneous. Trees.	Miscellaneous. Poles.	Totals. Trees.	Totals. Poles.	Grand Total.
Siún	1881-82	13	116	..	...	...	...	13	116	129
	1882-83	12	130	..	...	...	...	12	130	142
	1883-84	9	73	.	32	...	...	9	105	114
	1884-85	10	94	...	...	...	...	10	94	104
	1885-86	.	...	...	...	...	...	...	...	...
Totals for 5 years ...	..	44	443	...	32	...	...	44	445	489
Average per annum ...	...	9	83	...	6	..	...	9	89	98

From 1871-72, when the forest first came under departmental control, to 1880-81 they were given chir dundárs and bánsas as follows:—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundars	68	140	148	...	47	51	54	...	90	101	699
Bansás	18	100	118	...	22	42	994	18	80	84	1,476

Siún 1.

Boundaries.—North, west, and south, outer boundary of forests; east, compartment 2 and two enclosed chaks of village lands.

Area.—62 acres, of which 5 unproductive.

Configuration and aspect.—Northerly slopes comprising mainly the basin of a small much-branched stream. Ruling gradient 25°.

Elevation.—Maximum 6,200 feet, minimum 5,668 feet, mean 5,900 feet.

Soil and underlying rock.—Sandy, deep, rich; excellent for mixed chír and bánj. Rock as in rest of forest.

Stock.—With the exception of a few blank places, the density ranges from 0·5 to 0·8; principally oak and other broad-leaved species at the higher elevations and in the ravines and more or less pure chír elsewhere. Quality 0·5.

Summary of valuation.

Species	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	30	2,250	56	2,520	585	11,700	2,655	21,240	3,326	37,710
Oaks	161	11,592	271	5,691	391	3,549	798	2,394	1,621	23,196
Miscellaneous	48	1,440	141	1,974	368	2,944	1,156	2,312	1,713	8,670
Total ...	239	15,282	468	10,185	1,344	18,163	4,609	25,946	6,660	69,576

Reproduction.—Low poles of chír and coppice oak are fairly abundant and there is a sprinkling of recent chír seedlings in the lower ¾ths of the area. Co-efficient of completeness, 0·5; would be higher but for the grazing and lopping.

Accessibility.—Four miles of coolie carriage with 9 by cart.

Siún 2.

Boundaries.—North and south, boundary of forest; east, compartments 3, 4, and 5; west, compartment and boundary of forest.

Area.—69 acres, of which 5 unproductive.

Configuration and aspect.—Northerly slopes forming the long narrow basin of a sot. Ruling gradients 25° to 35°.

Elevation.—Maximum 6,550 feet, minimum 5,600 feet, mean 6,050 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Oak predominates in upper half of area (nearly pure at top), chír in lower half. Average density 0·6, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	28	2,100	35	1,575	224	4,480	1,368	10,944	1,655	19,099
Oaks .. .	154	11,088	195	4,095	337	3,033	709	2,127	1,395	20,343
Miscellaneous	50	1,500	102	1,428	261	2,088	1,614	3,228	2,027	8,244
Total ...	232	14,688	322	7,098	822	9,601	3,691	16,299	5,077	47,686

Reproduction.—Co-efficient of completeness, 0·7. Low poles and saplings of chír and oak abundant, and a fair sprinkling of recent chír seedlings everywhere except where, on account of great elevation, oak is pure.

Accessibility.—As for compartment 1.

Siún 3.

Boundaries.—North, boundary of forest; east, and south, compartment 4: west, compartment 2.

Area.—136 acres, of which 10 unproductive.

Configuration and aspect.—Northerly and north-easterly, more or less rounded, uniform slopes with an average gradient of about 25°.

Elevation.—Maximum 6,400 feet, mimimum 5,242 feet, mean 5,800 feet.

Soil and underlying rock.—Soil shallow, poor, dry; excellent for chír. Rock as usual.

Stock.—An open crop (average density 0·4) of chír mainly, the broad-leaved species being for the most part confined to the ravines. Quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	911	68,325	425	19,125	553	11,060	3,007	24,056	4,896	112,566
Oaks	39	2,808	26	546	64	576	180	540	309	4,470
Miscellaneous	10	300	55	770	142	1,136	1,036	2,072	1,243	4,278
Total ...	960	71,433	506	20,441	759	12,772	4,223	5,068	6,448	121,314

Reproduction.—Saplings and low poles of chír abundant in patches; seedlings numerous nearly everywhere, coming on well in places in spite of heavy grazing. Co-efficient of completeness, 0·6.

Accessibility.—30 miles of coolie carriage with 5 by cart.

Siún 4.

Boundaries.—North, compartment 3 and boundary of forest; east and south, boundary of forests and compartment 5; west, compartment 2.

Area.—61 acres, of which 5 unproductive.

Configuration and aspect.—Easterly and north-easterly slopes forming part of basin of the Tigaria gád. Average gradient 30°.

Elevation.—Maximum 6,600 feet, minimum 5,296 feet, mean 6,000 feet.

Soil and underlying rock.—Soil rather deeper and moister than in compartment 3; excellent for mixed chír and bánj wherever elevation does not keep out chír. Rock as usual.

Stock.—More or less pure oak at the top of the compartment and in the gullies, with chír elsewhere. Mean density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	94	7,050	163	7,335	616	12,320	1,484	11,872	2,357	38,577
Oaks	67	4,824	92	1,932	123	1,107	374	1,122	656	8,985
Miscellaneous	16	480	36	504	107	856	1,045	2,090	1,204	3,930
Total ...	177	12,354	291	9,771	846	14,283	2,903	14,084	4,217	51,492

Reproduction.— As in compartment 2.

Accessibility.—As for compartment 3.

Siún 5.

Boundaries.—North, boundary of forest; east, compartment 7; south, boundary of forest and compartment 6; west, compartments 2 and 4.

Area.—130 acres, of which 10 unproductive.

Configuration and aspect.—Northerly slopes comprising the greater portion of the basin of the Tigaria gád. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,688 feet, minimum 5,800 feet, mean 6,300 feet.

Soil and underlying rock.—Slightly deeper and moister than even in compartment 4.

Stock.—Distributed as in compartment 4; but, owing to greater elevation, the proportion of broad-leaved forests is very much larger.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	99	7,425	200	9,000	1,473	29,460	2,390	19,120	4,162	65,005
Oaks	614	44,208	503	10,563	1,141	10,269	2,342	7,026	4,600	72,066
Miscellaneous	193	5,790	286	4,004	884	7,072	4,889	9,778	6,252	26,644
Total ...	906	57,423	989	23,567	3,498	46,801	9,621	35,924	15,014	1,63,715

Reproduction.—As in compartment 4.

Accessibility.—About one mile more of coolie carriage than from compartment 3.

Siún 6.

Boundaries.—North, compartment 5; east, south, and west, boundary of forest.

Area—74 acres, of which 10 unproductive.

Configuration and aspect—Steep southerly slopes: ruling gradient nearly 40°.

Elevation.—Maximum 6,688 feet, minimum 6,000 feet, mean 6,400 feet.

Soil and underlying rock.—Soil shallow, often absent, covered with a dense growth of undershrubs, such as *Indigofera atropurpurea.*

Stock—Nearly pure bánj. Average density 0·5, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	...	...	...	...	1	20	5	40	6	60
Oaks	407	29,304	580	12,180	1,361	12,240	1,164	3,492	3,512	57,225
Miscellaneous	1	30	2	28	10	80	75	150	88	288
Total ...	408	29,334	582	12,208	1,372	12,340	1,244	3,682	3,606	57,573

Reproduction.—Kept back by dense growth of undershrubs. Co-efficient of completeness, 0·2.

Accessibility.—Nearly one mile more of coolie carriage than from compartment 5 on the other face of the hill.

Siún 7.

Boundaries.—North and east, boundary of forest; south, compartment 8 and boundary of forest; west, compartment 5.

Area.—74 acres, of which 10 unproductive.

Configuration and aspect.—Steep northerly slopes comprising the headwaters of numerous small sots. Ruling gradients 30° to 35°.

Elevation.—Maximum 6,422 feet, minimum 5,706 feet, mean 6,150 feet.

Soil and underlying rock.—As in compartment 5, but slightly moister. Soil excellent for bánj and chír mixed. Heavy brushwood everywhere.

Stock.—Mainly an open forest of oak and its broad-leaved allies, chír being found only in the lower portions of the compartment and along the crests of spurs. Average density 0·4, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	11	825	88	3,960	201	4,020	261	2,088	561	10,893
Oaks	165	11,880	301	6,321	505	4,545	620	1,860	1,591	24,606
Miscellaneous	21	630	60	840	126	1,008	730	1,460	937	3,938
Total ...	197	12,335	449	11,121	832	9,573	1,611	5,408	3,089	39,437

Reproduction.—Recent reproduction backward on account of heavy brushwood and lopping, but coppice of a certain age abundant. Co-efficient of completeness, 0·6.

Accessibility.—As for compartment 5.

Siún 8.

Boundaries.—North, compartment 7 and boundary of the forest; east and south, compartment 9; west and south, boundary of forest.

Area.—71 acres, of which 6 unproductive.

Configuration and aspect.—North-easterly slopes with an average gradient of 33°.

Elevation.—Maximum 6,400 feet, minimum 5,158 feet, mean 6,000 feet.

Soil.—As in compartment 5

Stock.—As in compartment 7, but with a larger proportion of chír by reason of the broader spurs, lower elevation, and more exposed aspect.

Summary of vluation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	11	825	45	2,025	278	5,560	473	2,984	807	11,394
Oaks	174	12,528	198	4,158	331	2,979	535	1,605	1,238	21,270
Miscellaneous	15	450	71	994	136	1,088	869	1,738	1,091	4,270
Total ...	200	13,803	314	7,177	745	9,627	1,877	6,327	3,136	36,934

Reproduction.—As in compartment 7.

Accessibility.—A little more coolie carriage than from compartment 7.

Siún 9.

Boundaries.—North, compartment 8; east, south, and west, boundary of forest.

Area.—50 acres, of which 4 unproductive.

Configuration and aspect.—As in compartment 8, but slopes slightly steeper.

Elevation.—Maximum 6,400 feet, minimum 5,158 feet, mean 6,000 feet.

Soil.—As in compartment 8.

Stock.—As in compartment 8, but the chír forest occupies a proportionately larger area, and the density averages 0·6, the stock in many of the gullies being complete.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	5	375	92	4,140	462	9,240	487	3,896	1,046	17,651
Oaks	243	17,496	166	3,486	239	2,151	699	2,097	1,347	25,230
Miscellaneous	33	990	89	1,246	233	1,864	1,522	3,044	1,877	7,144
Total ...	281	18,861	347	8,872	934	13,255	2,708	9,037	4,270	50,025

Reproduction.—As in compartment 8.

Accessibility.—About a mile more coolie carriage than from compartment 8.

CHAPTER III.—THE KATHÁLEKH FOREST.

Situation and boundaries.—This forest extends between 29°-36′ and 29°-38′-23″ north latitude and 79°-23′-45″ and 79°-26′-47″ east longitude. It lies in two pattis (Malli Doti and Sílour) of pargana Páli Pachháon. For a little more than a mile its boundary on the west marches with that of the Sauni forest. At every other point it is conterminous with village lands. Its nearest and farthest points are respectively 5 and 11 miles from Ránikhet.

Area.—1,813 acres, of which 169 unproductive.

Number of compartments.—17.

Topography.—The forest stretches for nearly 3 miles along the great Kathálekh ridge, which runs north-west and south-east, forming the watershed line between the Gaggás river, a feeder of the Rámganga, on the north, and the Kúnch gád, a feeder of the Kosi, on the south. Numerous well-marked spurs run down from the main ridge, forming between them generally broad open basins. Of the total area 786 acres lie on the northern face of the hill and 1,027 on the southern face. The slopes seldom attain 45,° and the ruling gradients generally vary from 20° to 35°.

Elevation.—Maximum 6,458 feet, minimum 4,800 feet, mean 5,600 feet.

Soil and underlying rock.—The entire hill is composed of sandstone, nearly always micaceous and schistose, and often easily crumbling away under weather influences. The disintegration of this rock produces a fine, but free, sandy soil, excellent for the growth of chír, especially in mixture with bánj. At present, with the heavy grazing and recent annual occurrence of fire, the soil is very poor.

Stock.—The following is a complete enumeration of the trees according to diameter classes :—

Species.	Diameter class.	Compartment 1, area 102 acres.		Compartment 2, area 55 acres.		Compartment 3, area 98 acres.		Compartment 4, area 110 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	59	·48	28	·50	128	1·30	70	·63
	II.	332	3·25	190	3·45	481	4·90	517	4·7
	III.	580	5·68	694	12·61	781	7·96	1,409	12·80
	IV.	5,036	49·37	1,403	25·50	2,108	21·51	1,243	11·3
Total ...	...	6,007	58·89	2,315	42·09	3,498	35·69	3,239	29·44
Phanáth ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	IV.	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...
Báuj ...	I.	...	...	19	·34	124	1·26	68	·61
	II.	15	·14	51	·92	235	2·39	71	·64
	III.	42	·41	263	4·78	885	9·03	232	2·10
	IV.	87	·85	632	11·49	1,481	15·11	804	7·30
Total ...	...	144	1·41	965	17·54	2,725	27·80	1,175	10·68
Ayár ...	I.	...	...	...	...	4	·04	2	·01
	II.	3	·02	1	·01	10	·10	13	·11
	III.	11	·10	33	·06	207	2·11	246	2·23
	IV.	65	·63	493	8·96	1,248	12·73	1,200	10·90
Total ...	...	79	·77	527	9·58	1,469	14·98	1,461	13·28
Buráns ...	I,	...	...	...	...	6	·06	17	·15
	II.	...	...	1	·01	33	·33	75	·68
	III.	...	...	3	·05	252	2·57	470	4·27
	IV.	4	·03	8	·14	502	5·12	702	6·38
Total ...	...	4	.03	12	·21	793	8·09	1,264	11·49
Miscellaneous ...	I.	1	·01	...	...	1	·01	2	·01
	II.	1	·01	...	...	1	·01	1	·01
	III.	3	·02	2	·03	11	·11	12	·10
	IV.	24	·23	11	·2	47	·47	76	·69
Total ..	...	29	·28	13	·22	60	·61	91	·82
Grand Total ...	...	6,263	61·40	3,832	69·67	8,545	87·19	7,230	65·72

Compartment 5, area 128 acres.		Compartment 6, area 86 acres.		Compartment 7, area 139 acres.		Compartment 8, area 68 acres.		Compartment 9, area 53 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
157	1·22	106	1·23	77	·55	58	·85	141	2·66
626	4·89	288	3·34	284	2·04	87	1·27	63	1·18
1,508	11·78	1,085	12·61	2,609	18·76	541	7·95	292	5·50
3,442	26·89	2,135	24·82	4,864	34·99	1,466	21·55	1,375	25·94
5,733	44·78	3,614	42·02	7,834	56 35	2,152	31·64	1,871	35·30
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
1	·01	...	...	...	...	...	...	...	...
3	·02	...	...	...	...	...	...	...	...
33	·25	1	·01	...	...	...	...	...	...
81	·63	2	·02	...	...	...	...	...	...
118	·92	3	·03	...	...	...	...	...	...
2	·01	...	...	...	...	...	...	...	...
6	·04	1	·01	...	...	...	...	...	...
115	·89	18	·20	4	·02	...	...	...	...
834	6·51	120	1·39	190	1 36	14	·20	...	...
957	7·47	139	1·61	194	1 39	14	·20	...	...
4	·03	...	...	...	...	...	...	...	...
23	·17	...	...	...	...	...	...	...	...
99	·77	...	...	1	·01	...	...	...	...
153	1 19	...	...	4	·02	1	·01	...	..
279	2·17	...	...	5	·03	1	·01	...	...
..	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
2	·01	4	·04	...	...	...	...	...	...
22	·17	9	·10	6	·04	1	·01	...	...
24	·18	13	·15	6	·04	1	·01	...	...
7,111	55·55	3,769	43·82	8,039	57·83	2,168	31·88	1,871	35·30

Species.	Diameter class.	Compartment 10, area 128 acres.		Compartment 11, area 120 acres.		Compartment 12, area 146 acres.		Compartment 13, area 117 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	119	·92	778	6·03	504	3·45	332	2·83
	II.	258	2·01	905	7·01	545	3·73	597	5·10
	III.	831	6·49	1,733	13·43	2,009	13·76	1,261	10·77
	IV.	2,237	17·47	3,545	27·48	5,329	36·5	3,443	29·42
Total ...	...	3,445	26·91	6,961	53·96	8,387	57·44	5,633	48·14
Phanáth ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...
Bánj ...	I.	...	...	...	...	4	·02	40	·34
	II.	...	...	...	...	7	·04	32	·27
	III.	...	...	6	·04	6	·04	95	·81
	IV.	...	...	5	·03	18	·12	158	1·35
Total ...	...	...	...	11	·07	35	·23	325	2·77
Ayár ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	1	·01	11	·09
	III.	...	...	1	·01	6	·04	38	·32
	IV.	1	·01	3	·02	10	·04	178	1·52
Total ...	...	1	·01	4	·03	17	·11	227	1·94
Buráns ...	I.	...	..	...	...	...	...	1	·01
	II.	...	...	...	...	...	...	12	·10
	III.	...	...	...	...	...	...	25	·21
	IV.	...	...	...	...	1	·01	37	·31
Total ...	...	...	...	..	...	1	·01	75	·64
Miscellaneous ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	1	·01
	III.	...	...	5	·03	1	·01	...	...
	IV.	...	...	11	·08	...	...	9	·07
Total ...	...	...	...	16	·12	1	·01	10	·08
Grand Total ...	...	3,446	26·92	6,992	5,420	8,441	57·81	6,270	53·58

Compartment 14, area 150 acres.		Compartment 15, area 119 acres.		Compartment 16, area 110 acres.		Compartment 17, area 75 acres.		Entire forest, area 1,813 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
371	2·47	64	·53	324	2·94	86	1·14	3,402	1·87
612	4·08	159	1·33	651	5·91	142	1·89	6,737	3·70
2,420	16·13	2,207	18·54	994	9·03	877	11·69	21,831	12·04
6,404	42·69	6,253	52·54	1,772	16·10	2,349	31·32	54,404	30·00
9,807	65·38	8,683	72·96	3,741	34·00	3,454	46·05	86,374	47·64
...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...
...	...	...	...	3	·02	2	·02	5	·01
...	...	1	·01	5	·04	4	·05	10	·01
...	...	1	·01	8	·07	6	·08	15	·01
45	·3	5	·04	...	...	...	...	306	·16
41	.27	9	·07	...	...	...	...	464	·25
144	·96	27	·22	4	·03	2	·02	1,740	·95
504	3·36	90	·75	9	·08	9	·12	3,880	2·14
734	4·89	131	1.10	13	·11	11	·14	6,390	3·52
7	·04	...	...	...	...	...	...	15	...
11	·07	4	·03	...	...	...	...	61	·03
88	·58	20	·16	19	·17	4	·05	810	·44
551	3·67	254	2·13	150	1·36	71	·94	5,382	2·96
657	4·38	278	2·33	169	1.53	75	1·00	6,268	3·45
11	·07	...	...	...	...	...	...	39	·02
22	·14	4	·03	1	·01	1	·01	172	·09
18	·12	15	·12	11	·10	4	·05	898	·48
72	.48	31	·26	17	·15	10	·13	1,542	·85
123	·82	50	·42	29	·26	15	·20	2,651	1·46
1	·01	...	...	...	...	1	·01	6	·01
...	...	...	...	...	...	1	·01	5	·01
5	·03	8	·06	2	·01	6	·08	61	·03
31	·20	30	·25	6	·05	39	·52	322	·17
37	·24	38	·31	8	·07	47	·62	394	·21
1,358	75·72	9,181	77·15	3,968	36·07	3,608	48·10	102,092	56·31

It will be seen from the above that, for the present at least, pure chír forest is the predominant type. More oak would exist in mixture with the pine but for the heavy grazing and the unrestricted lopping it has been subject to for, perhaps, centuries. Naturally oak occurs in largest numbers on the higher northerly slopes in the western half of the forest.

The quantity of produce standing and that exploitable during the next 40 years are exhibited in the statements on pages 17 and 204 respectively.

Reproduction of chír is fair in spite of the heavy grazing, and, up to a recent period, regular annual fires, occurred over the entire area. But, as a rule, young seedlings are rare, and saplings and small poles, although fairly abundant, stand in patches. Low bánj coppice is found along the ravines and in sheltered places.

Fire conservancy.—The statistics of fire-conservancy, since special measures have been undertaken, are as follows :—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total.			Cost. Per acre actually protected.
						Rs.	a.	p.	Pies.
1877-78 ...	320	...	...	...	320	111	14	0	67·1
1878-79 ...	320	80	1	80	240	15	8	2	12·4
1879-80 ...	320	...	...	...	320	38	11	7	26·3
1880-81 ...	320	...	...	...	320	17	0	8	10·2
1881-82 ...	1,700	200	2	100	1,500	72	0	6	8·9
1882-83 ...	1,700	...	...	...	1,700	87	7	4	9·9
1883-84 ...	1,700	...	...	...	1,700	60	2	0	6·8
1884-85 ...	1,700	...	...	...	1,700	48	8	3	5·4
1885-86 ...	1,700	8	1	8	1,692	37	10	9	4·3
Total ...	9,780	288	4	72	9,492	486	15	3	9·8

Rights.—The undermentioned villages are allowed to exercise the rights noted against their names :—

Number of patti.	Names of villages having rights.	Description of rights. Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghâts.	Limestone.	Bamboos and bâbar.
Malli Dotti.	Nonghar	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Pathuli	R	R	R	R	R	...	R	R	...	...	R	...	...	R	...	...	...	...	...	...
	Shimuli	R	R	R	...	...	...	...	R	...	...	R	...	...	R	...	...	...	...	...	...
	Papua	R	R	R	R	...	...	...	R	...	...	R	...	...	R	...	...	...	...	...	...
	Kothar	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Bainath	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Gairarh	R	R	R	...	R	...	R	R	...	...	...	...	...	R	...	...	...	...	...	...
Malla Silotr.	Sarana	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Dadhuli	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Dabhar Malla	R	R	R	R	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dabhar Talla ...	R	R	R	R	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kote	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Leti	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Kafulti	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Timilah	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Katharpoura	...	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Sawkhola ...	R	R	R	R	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Mawra	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Malota	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Kotharpapnah	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Dadhuli	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows:—

Number.	Name of patti.	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total.
	Malli Doti	Noughar	128	...	...	30	158
		Pathuli	136	...	...	28	164
		Simauli	198	4	...	66	268
		Panna	78	4	...	...	82
		Kotar	70	6	...	...	76
		Baina	232	10	...	2	244
		Gairarh	258	34	...	96	388
	Malla Silour ...	Sana	60	20	...	4	84
		Dadhuli	160	4	...	50	214
		Dabar Malla	116	10	...	64	190
		Dabar Talla	142	10	...	46	198
		Kot	50	4	...	42	96
		Kheti	102	20	...	78	200
		Kaphalti	110	20	...	8	138
		Nimilai	200	20	...	26	246
		Sankhola	622	42	...	...	664
		Mailat	40	6	...	8	54
		Malota	90	12	...	16	118
		Total ...	2,722	226	...	564	3,582
		Average number per acre ...	1·5	0.1	...	0·3	1·9

As regards trees, the numbers the villages in question have actually received on requisition during the past five years are shown in the subjoined statement:—

Forest.	Year.	Chir. Trees.	Chir. Poles.	Oak. Trees.	Oak. Poles.	Miscellaneous. Trees.	Miscellaneous. Poles.	Total. Trees.	Total. Poles.	Grand Total.
Kathálekh	1881-82	15	120	...	43	...	...	15	163	178
	1882-83	51	271	...	...	...	...	51	271	322
	1883-84	60	210	...	36	...	...	60	246	306
	1884-85	41	275	...	...	...	...	41	275	316
	1885-86	78	394	...	71	...	...	78	465	543
Totals for 5 years ...	...	245	1,270	...	150	...	...	245	1,420	1,665
Average per annum ...	...	49	254	..	30	...	...	49	284	333

From 1871-72, when the forests first came under departmental control, to 1880-81 they were given chír dundárs and bansás as follows :—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundárs	172	97	318	199	229	448	15	131	100	224	1,933
Bansás	53	47	298	58	108	922	942	68	148	210	2,854

Kathálekh 1.

Boundaries.—North, east, and west, boundary of the forest, south, boundary of the forest and compartment 2.

Area.—102 acres, of which 5 unproductive.

Configuration and aspect.—The compartment sits astride the Dáuli Dhár, two-thirds of the area facing north, the rest west. The slopes are very uniform and the gradients seldom exceed 30°.

Elevation.—Maximum 5,700 feet, minimum 5,000 feet, mean 5,370 feet.

Soil and underlying rock.—Soil a fine free sand, dry, overlying micaceous schistose sandstone; excellent for mixed chír and banj.

Stock.—Principally a chír forest, with a little miserable mutilated bánj, which has no chance, under the prevailing heavy grazing and lopping, of extending itself, as it would otherwise do. Average density 0·4, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	59	4,425	332	14,940	580	11,600	5,036	40,288	6,007	71,253
Oaks	...	...	15	315	42	378	87	261	144	954
Miscellaneous	1	30	4	56	14	112	93	186	112	384
Total ...	60	4,455	351	15,311	636	12,090	5,216	40,735	6,263	72,591

Reproduction.—Principally saplings and small poles of chír, the heavy grazing and, until recently, annual conflagrations effectually keeping down recent reproduction. Co-efficient of completeness, 0·4.

Accessibility.—Just below cart-road, a little less than nine miles from Ránikhet.

Kathálekh 2.

Boundaries.—North and east, compartment 1 and the boundary of the forest; south, compartment 2; west, compartments 14 and 15 on the other side of main ridge.

Area.—55 acres, of which 5 unproductive.

Configuration and aspect.—Uniform north-easterly slopes with a ruling gradient of about 20°.

Elevation.—Maximum 6,170 feet, minimum 5,700 feet, mean 5,850 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Mixed chír and bánj of an older type than stock in compartment 1, the very heavy grazing having had more disastrous results on the young growth. Average density 0·4, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	28	2,100	190	8,550	694	13,880	1,403	11,224	2,315	35,754
Oaks	19	1,368	51	1,071	263	2,367	632	1,896	965	6,702
Miscellaneous	...	...	2	28	38	304	512	1,024	552	1,356
Total ...	47	3,468	243	9,649	995	16,551	2,547	14,144	3,832	43,812

Reproduction.—Rather worse than in compartment 1.

Accessibility.—On cart-road, 8¼ miles from Ránikhet.

Kathálekh 3.

Boundaries.—North, compartment 2 and boundary of forest; east, compartment 4; south and west, compartments 13 and 14.

Area.—98 acres, of which 5 unproductive.

Configuration and aspect.—Northerly and north-easterly slopes of from 5° to 30° intersected by several gullies.

Elevation.—Maximum 6,458 feet, minimum 5,700 feet, mean 6,050 feet.

Soil and underlying rock.—Soil sandy, shallow, frequently exposing the underlying schist, moist in places (two springs occur); excellent for mixed chír and bánj.

Stock.—A forest of mixed chír and bánj with ayár and buráns. Average density 0·6, quality 0·4. This area has been at some time under cultivation.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	128	9,600	481	21,645	781	15,620	2,108	16,864	3,498	63,729
Oaks	124	8,928	285	4,935	885	7,965	1,481	4,443	2,725	26,271
Miscellaneous	11	330	44	616	470	3,760	1,797	3,594	2,322	8,300
Total ...	263	18,858	760	27,196	2,136	27,345	5,386	24,901	8,545	98,300

Reproduction.—Very fair, but kept back by grazing. Co-efficient of completeness, 0·5.

Accessibility.—On cart-road, less than eight miles from Ránikhet.

Kathálekh 4.

Boundaries.—North, boundary of forest; east, compartment 5; south, compartments 12 and 13 on the other side of the main ridge; west, compartment 3.

Area.—110 acres, of which 10 unproductive.

Configuration and aspect.—Northerly slopes of from 15° to 30°, except near the cart-road, where they are usually steeper.

Elevation.—Maximum 6,385 feet, minimum 5,600 feet, mean 5,950 feet.

Soil and underlying rock.—As in compartment 3.

Stock.—Very much as in compartment 3.

Summary of valuation.

Species	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	70	5,250	517	23,265	1,409	28,180	1,253	9,944	3,239	66,639
Oaks	68	4,896	71	1,491	232	2,088	804	2,412	1,175	10,887
Miscellaneous	21	630	89	1,840	728	5,824	1,978	3,956	2,816	11,656
Total ...	159	10,776	677	26,002	2,369	36,002	4,025	16,312	7,230	89,182

Reproduction.—Very fair. Co-efficient of completeness, 0·5.

Accessibility.—On cart-road, 7 miles from Ránikhet.

Kathálekh 5.

Boundaries.—North, boundary of forest and compartment 6; east, compartment 7; south, compartments 10 and 12 and boundary of forest; west, compartment 4.

Area.—128 acres, of which 10 unproductive.

Configuration and aspect.—Northerly slopes with gradients of from 15° to 30°.

Elevation.—Maximum 6,301 feet, minimum 5,500 feet, mean 5,850 feet.

Soil and underlying rock.—As in compartment 3.

Stock.—Principally a young promising forest of chír, with a very slight admixture of oak, ayár, and buráns. Density 0·5, quality 0·7. This area has been closed against grazing and protected from fire since 1880.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	157	11,775	626	28,170	1,508	30,160	3,442	27,536	5,733	97,641
Oaks	1	72	3	63	33	297	81	243	118	675
Miscellaneous	6	180	29	406	216	1,728	1,009	2,018	1,266	4,332
Total ...	164	12,027	658	28,639	1,757	32,185	4,532	29,797	7,111	1,02,648

Reproduction.—Nearly established. Co-efficient of completeness, 0·7.

Accessibility.—On cart-road, 6½ miles from Ránikhet.

Kathálekh 6.

Boundaries.—North and east, outer boundary of the forest; south, the Ránikhet-Rámnagar road separating the compartment from compartments 5 and 7.

Area.—86 acres, of which 10 unproductive.

Configuration and aspect.—Rugged northerly slopes, consisting of a succession of deep glens and high, sharp spurs and ridges. Ruling gradient 25°.

Elevation.—Maximum 5,600 feet, minimum 4,800 feet, mean 5,300 feet.

Soil and underlying rock.—Soil sandy, shallow, overlying crumbling schists; excellent for chír and bánj.

Stock.—Principally a forest of chír of very variable density, about a third of the area being very open. Quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	106	7,950	288	12,960	1,085	21,700	2,135	17,010	3,614	59,690
Oaks	...	...	...	...	1	9	2	6	3	15
Miscellaneous	...	...	1	14	22	176	129	253	152	448
Total ...	106	7,950	289	12,974	1,108	21,885	2,266	17,344	3,768	50,153

Reproduction.—A very fair sprinkling of chír, mainly in the low pole stage, nearly everywhere. Recent reproduction generally absent owing to heavy grazing. Some young bánj coppice in the ravines. Co-efficient of completeness, 0·5.

Accessibility.—On cart-road, 6 miles from Ránikhet.

Kathálekh 7.

Boundaries.—North, Ránikhet-Rámnagar cart-road separating compartment from compartment 6; east, outer boundary of the forest; south, outer boundary of the forest and main watershed line separating compartment from compartment 10; west, a spur separating it from 5.

Area.—139 acres, of which 15 unproductive.

Configuration and aspect.—Northerly slopes, somewhat less rugged and steep than in compartment 6.

Elevation.—Maximum 6,200 feet, minimum 5,400 feet, mean 5,850 feet.

Soil and underlying rock.—As in compartment 6, but drier; excellent for chír.

Stock.—Nearly pure chír forest of greater density than in compartment 6 and of better quality (co-efficient 0·6).

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	77	5,775	284	12,780	2,609	52,180	4,864	38,912	7,834	1,09,647
Oaks	...	...	...	..	...	...	...	...	...	...
Miscellaneous	...	...	...	...	5	40	200	400	205	440
Total ...	77	5,775	284	12,780	2,614	52,220	5,064	39,312	8,039	1,10,087

Reproduction.—A very good sprinkling of chír nearly everywhere, chiefly poles. Young reproduction very scarce owing to heavy grazing. Co-efficient of completeness, 0·6.

Accessibility.—On cart-road, less than 8 miles from Ránikhet.

Kathálekh 8.

Boundaries.—North, east, and west, boundary of forest; south, compartment 9.

Area.—68 acres, of which 8 unproductive.

Configuration and aspect.—Northerly slopes, furrowed by a few deep gullies and with gradients averaging 25°.

Elevation.—Maximum 5,725 feet, minimum 5,700 feet, mean 5,300 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—Of the same type as in compartment 6, but rather more open owing to recent fellings.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	58	4,350	87	3,915	541	10,820	1,466	11,728	2,152	30,813
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	...	...	16	32	16	32
Total ...	58	4,350	87	3,915	541	10,820	1,482	11,760	2,168	30,845

Reproduction.—As in compartment 6.

Accessibility.—About ¾ mile of coolie carriage to a point on the cart-road 5 miles from Ránikhet.

Kathálekh 9.

Boundaries.—North, boundary of forest and compartment 8; east and south, boundary of forest; west, compartment 10.

Area.—53 acres, of which 8 unproductive.

Configuration and aspect.—Steep, rugged southerly slopes. Ruling gradient 35°.

Elevation.—Maximum 6,050 feet, minimum 5,600 feet, mean 5,750 feet.

Soil and underlying rock.—As in compartment 8, but shallower and oftener absent.

Stock.—Very open pure chír forest. Average density 0·3, quality 0·30.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	141	10,575	63	2,835	292	5,840	1,375	11,000	1,871	30,250
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	...	...	...	...	...	...
Total ...	141	10,575	63	2,835	292	5,840	1,375	11,000	1,871	30,250

Reproduction.—Co-efficient of completeness, 0·4, in spite of light grazing.

Accessibility.—About 1½ miles of coolie carriage, mainly along a good bridle-road, to a point on cart-road about 5¼ miles from Ránikhet.

Kathálekh 10.

Boundaries.—North, compartments 5 and 7 on the other side of the main ridge; east, compartment 9 and boundary of forest; south and west, outer boundary of forest, and compartment 12.

Area.—128 acres, of which 15 unproductive.

Configuration and aspect.—Southerly slopes, consisting of a succession of numerous spurs and ravines and gullies. Ruling gradients 30° to 40°.

Elevation.—Maximum 6,301 feet, minimum 5,200 feet, mean 5,800 feet.

Soil and underlying rock.—As in compartment 12.

Stock.—Similar to that in compartment 9, but still more open and unpromising.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	119	8,925	258	11,610	831	16,620	2,237	17,896	3,445	55,051
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	...	...	1	2	1	2
Total ...	119	8,925	258	11,610	831	16,620	2,238	17,898	3,446	55,053

Reproduction.—More backward than in compartment 9.

Accessibility.—Produce may be carried out (1) either straight over the hill to the cart-road, in which case the length of coolie carriage would be one mile and by cart 6 miles; or (2) along a narrow bridle-road which traverses the entire width of the compartment, in which case the length of carriage on coolies or mules would be 1½ miles and by cart 5½ miles.

Kathálekh 11.

Boundaries.—North, compartment 12; east, south, and west, outer boundary of forests.

Area.—129 acres, of which 10 unproductive.

Configuration and aspect.—Mainly southerly slopes, generally easy (30°), except immediately over the Kúnchgád. About 15 acres look east and are steep (ruling gradient 40°).

Elevation.—Maximum 5,950 feet, minimum 5,100 feet, mean 5,500 feet.

Soil and underlying rock.—Soil sandy, shallow, dry; excellent for chír and for oak. Underlying rock as usual.

Stock.—Mainly pure chír, except at the higher elevations where bánj comes in, without, however, becoming abundant. Density very variable. Average co-efficient 0·4. Quality 0·6.

Summary of valuation.

Species	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	778	58,350	905	40,725	1,733	34,660	3,545	28,360	6,961	1,62,096
Oaks	...	...	...	...	6	54	5	15	11	69
Miscellaneous	...	...	...	...	6	48	14	28	20	76
Total ...	778	58,350	905	40,725	1,745	34,762	3,564	28,403	6,992	1,62,240

Reproduction.—Very backward on account of the heavy grazing. Co-efficient of completeness, 0·2.

Accessibility.—A narrow bridle-path traverses the compartment and at the end of a little less than 3 miles meets the cart-road near the 5th milestone from Ránikhet.

Kathálekh 12.

Boundaries.—North, compartments 4 and 5 on the other side of the watershed line; east and south, the outer boundary of the forest and compartment 11; west, compartments 11 and 12 and outer boundary of the forest.

Area.—146 acres, of which 20 unproductive.

Configuration and aspect.—The upper catchment-basin of the Narodar nála, a succession of ravines and rounded spurs converging towards the southern or lowest point of the compartment. The aspects are mainly easterly and southerly. Ruling gradient 25°.

Elevation.—Maximum 6,385 feet, minimum 5,600 feet, mean 5,900 feet.

Soil and underlying rock.—Soil generally dry; excellent for chír.

Stock.—Similar to that in compartment 11, but somewhat denser and perhaps slightly inferior in quality.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of woods.
Chír	504	37,800	545	24,525	2,009	40,180	5,329	42,632	8,387	1,45,137
Oaks	4	288	7	147	6	54	18	54	35	543
Miscellaneous	...	...	1	14	7	56	11	22	19	92
Total ...	508	38,088	553	24,686	2,022	40,290	5,358	42,708	8,441	1,45,772

Reproduction.—Chír seedlings sprinkled everywhere, with groups of saplings and small poles in patches. Grazing, nevertheless, at present heavy. Co-efficient of completeness, 0·5.

Accessibility.—On the same narrow bridle-path as compartment 11, but about a mile nearer.

Kathálekh 13.

Boundaries.—North, compartments 14 and 3; east, compartment 12; south and west, outer boundary of forest.

Area.—117 acres, of which 10 unproductive.

Configuration and aspect.—South-westerly slopes cut up by numerous deep ravines and gullies. Gradients variable between 15° and 45°, but average fall of ground only 20°.

Elevation.—Maximum 6,458 feet, minimum 6,000 feet, mean 6,200 feet.

Soil and underlying rock.—As in compartment 12.

Stock.—Nearly pure chír forest, except at the bottom of the ravines and gullies, where miserable overlopped bánj and other broad-leaved species put in an appearance. Average density 0·4, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	332	24,900	597	26,865	1,261	25,220	3,443	27,544	5,633	1,04,529
Oaks	40	2,880	32	672	95	855	158	477	325	4,881
Miscellaneous	1	30	24	336	63	504	224	448	312	1,318
Total ...	373	27,810	653	27,873	1,419	26,579	3,825	28,466	6,270	1,10,728

Reproduction.—As in compartment 12.

Accessibility.—About a mile of coolie carriage across the main ridge to a point on the cart-road between the 7th and 8th milestones from Ránikhet.

Kathálekh 14.

Boundaries.—North, compartments 2 and 15; east, compartments 3 and 13; south, boundary of forest; west, compartment 16.

Area.—150 acres, of which 10 unproductive.

Configuration and aspect.—Generally westerly slopes comprising the shallow open basins of two branches of the Luarera-Liuta Pokhar gadhora, which basins are separated by a broad flat spur. Ruling gradients 25° to 30°.

Elevation.—Maximum 6,458 feet, minimum 5,800 feet, mean 6,100 feet.

Soil and underlying rock.—As in compartment 12.

Stock.—Principally a chír forest, with a light admixture of bánj and ayár. The western half contains the finer though younger crop. Average density 0·5, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	371	27,825	612	27,540	2,420	48,400	6,404	51,232	9,807	1,54,997
Oaks	45	3,240	41	861	144	1,296	504	1,512	734	6,909
Miscellaneous	19	570	33	462	111	888	654	1,308	817	3,228
Total ...	439	31,635	686	28,863	2,675	50,584	7,562	54,052	11,358	1,65,134

Reproduction.—Co-efficient of completeness, 0·5. Mainly chír, kept back by heavy grazing.

Accessibility.—The average distance of carriage on coolies across the main ridge to the cart-road at the 8th milestone from Ránikhet will be about a mile.

Kathálekh 15.

Boundaries.—North, boundary of forest and compartment 5; east, compartment 14; south, compartment 16 and boundary of forest; west, boundary of forest.

Area.—119 acres, of which 10 unproductive.

Configuration and aspect.—Mainly comparatively rugged westerly and south-easterly slopes comprising the deep basin of the highest branch of the Luarera-Liuta Pokhar gadhera. Ruling gradients varying from 20° to 30°.

Elevation.—Maximum 6,100 feet, minimum 5,600 feet, mean 5,900 feet.

Soil and underlying rock.—As in compartment 14, but some damp cool places are met with near the bottom.

Stock.—Principally chír. In the western half of the compartment there are many blanks, and the average density is barely 0·4. In the other half the average density is about 0 6 and the stock is appreciably younger. Quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	64	4,800	159	7,155	2,207	44,140	6,253	50,024	8,683	1,06,119
Oaks	5	360	9	189	27	243	91	273	132	1,065
Miscellaneous	...	...	8	112	43	344	315	630	366	1,086
Total ...	69	5,160	176	7,456	2,277	44,727	6,659	50,927	9,181	1,08,270

Reproduction.—Co-efficient of completeness in the two halves respectively 0·4 and 0·5. Principally saplings and small poles, recent seedlings being few and far between owing to the heavy grazing.

Accessibility.—Just below the cart-road, 9 miles from Ráuikhet.

Kathálekh 16.

Boundaries.—North, boundary of forest and compartment 15; east, compartment 14 and boundary of forest; south, boundary of forest and Sauni 6; west, Sauni 12 and Kathálekh 17.

Area.—110 acres, of which 10 unproductive.

Configuration and aspect.—Principally the lower portion of the deep basin of the Luarera-Liuta Pokhar gadhera. All aspects, except easterly and north-easterly ones, are represented. Gradients very variable, but seldom less than 20° and averaging 30°.

Elevation.—Maximum 5,800 feet, minimum 5,350 feet, mean 5,550 feet.

Soil and underlying rock.—Soil sandy, very shallow, not unfrequently exposing the underlying schist; excellent for chír.

Stock.—A deteriorating, formerly good, forest of nearly pure chír. Average density 0·4, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	324	24,300	651	29,295	994	19,880	1,772	14,176	3,741	87,650
Oaks	...	...	...	...	7	63	14	42	21	105
Miscellaneous	...	...	1	14	32	256	173	346	206	616
Total ...	324	24,300	652	29,309	1,033	20,199	1,959	14,564	3,968	88,372

Reproduction.—Very backward owing to grazing, although in the steeper portions a sprinkling of chír seedlings is gradually coming on.

Accessibility.—One mile of carriage on coolies and 9 by cart.

Kathálekh 17.

Boundaries.—North, boundary of forest, east, boundary of forest and compartment 16; south and west, Kunchgarra gád separating it from Sauni 12.

Area.—75 acres, of which 8 unproductive.

Configuration and aspect.—Mainly south-westerly slopes overhanging the Kunchgarra gád. Ruling gradients 25° to 30°.

Elevation.—Maximum 5,700 feet, minimum 5,400 feet, mean 5,525 feet.

Soil and underlying rock.—Dry, shallow, resting on crumbling schists; excellent for chír.

Stock.—Principally a pure chír forest. Average density 0·4, quality 0 4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of woods.
Chír	86	6,450	142	6,390	877	17,540	2,349	18,702	3,454	49,172
Oaks	...	...	...	...	4	36	13	39	17	75
Miscellaneous	1	30	2	28	14	112	120	240	137	410
Total ...	87	6,480	144	6,418	895	17,688	2,482	19,071	3,608	49,657

Reproduction.—As in compartment 16.

Accessibility.—Half a mile on coolies and 10½ miles by cart-road.

CHAPTER IV.—THE GANIÁDEOLI FOREST.

Situation and boundaries.—This forest lies between 29°-36′-20″ and 29°-38′-30″ north latitude and 79°-29′-30″ and 79°-27′-59″ east longitude. The main watershed line divides it into two parts, by far the lesser of which (about 250 acres) is in Patti Silour, the other being in Patti Malli Doti, both pattis belonging to pargana Páli Pachháon. At its northern exteremity the forest marches for nearly a mile with the south-western corner of the cantonment. The other boundaries are village lands.

Area.—909 acres, of which 95 unproductive.

Number of compartments.—10.

Topography.—The greater portion of the area, that belonging to Patti Malli Doti, occupies the eastern flank of a great spur that runs down south from the western extremity of the cantonment, and lower down sits astride a large offshoot of that spur contained between the Kota and Tárkhet gadheras. The slopes thus sweep round numerous spurs, changing aspect at the same time; but easterly aspects predominate, and after them westerly outlooks. The ruling gradients are 30° to 35°, but in places to the south they run up to 40° and 45°. Many old abandoned cultivation terraces are met with.

Elevation.—Maximum 5,986 feet, minimum 4,400 feet, mean 5,200 feet.

Soil and underlying rock.—White quartzite generally forms the backbone of the ridge and micaceous schistose sandstone the flanks. The sandstone disintegrates so easily that on the bare steep southerly slopes at the southern extremity of the forest the land has slipped in places. The soil is the usual fine free sandy soil of these hills, unenriched by vegetable detritus, owing to the almost complete absence of broad-leaved species; an excellent soil for mixed chír and bánj.

Stock.—The following is a summary of the enumeration survey of the stock, including all stems 18 inches and upwards in girth :—

Species.	Diameter class.	Compartment 1, area 136 acres. Gross number of trees.	Compartment 1, area 136 acres. Number of trees per acre.	Compartment 2, area 103 acres. Gross number of trees.	Compartment 2, area 103 acres. Number of trees per acre.	Compartment 3, area 70 acres. Gross number of trees.	Compartment 3, area 70 acres. Number of trees per acre.	Compartment 4, area 103 acres. Gross number of trees.	Compartment 4, area 103 acres. Number of trees per acre.
Chír ...	I.	93	·68	73	·70	82	1·17	75	·72
	II.	392	2·88	636	6·17	596	8·51	504	4·84
	III.	892	6·51	1,361	13·20	1,374	19·62	1,635	15·87
	IV.	2,679	19·69	671	6·51	1,317	18 81	666	6·46
Total ...	...	4,056	29·82	2,741	26·61	3,369	48·12	2,880	27·96
Phanáth ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	IV.	...	...	...	...	1	·01	...	...
Total ...	...	...	...	...	...	1	·01	...	...
Bánj ...	I.	...	...	...	...	1	·01	...	...
	II.	2	·01	1	·01	5	·07	...	...
	III.	19	·14	1	·01	28	·40	...	...
	IV.	94	·69	8	·07	48	·68	...	...
Total ...	...	115	·84	10	·09	82	1·17	...	...
Ayár ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	9	·06	1	·01	4	·05	1	·01
	IV.	52	·38	11	·10	25	·34	2	·01
Total ...	...	61	·44	12	·11	29	·41	3	·02
Buráns ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	9	·12	...	...
	IV.	6	·04	6	·05	12	·17	...	...
Total ...	...	6	·04	6	·05	21	·30	...	...
Miscellaneous ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	1	·01	4	·05	...	...
	III.	7	·05	5	·04	17	·24	1	·01
	IV.	20	·14	38	·36	59	·84	3	·02
Total ...	...	27	·19	44	·42	80	1·14	4	·03
Grand Total ...	...	4,265	31·36	2,813	27·31	3,582	51·17	2,887	28·02

Compartment 5, area 84 acres		Compartment 6, area 67 acres		Compartment 7, area 50 acres		Compartment 8, area 88 acres		Compartment 9, area 138 acres		Compartment 10, area 70 acres		Entire forest, area 909 acres	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre	Gross number of trees.	Number of trees per acre	Gross number of trees	Number of trees per acre.	Gross number of trees.	Number of trees per acre	Gross number of trees	Number of trees per acre	Gross number of trees.	Number of trees per acre
89	1·06	67	1·00	45	·90	70	·79	267	1 93	154	2 20	1,015	1 11
466	5 54	369	4 61	257	5·14	308	3·5	540	3 97	222	3·17	4,239	4·66
1,030	12·26	993	14 82	310	6 20	1,185	13·46	699	5·06	148	2·11	9,627	10 59
883	10 51	1,766	26·35	419	8·38	2,815	31 98	1,818	13 17	395	5·64	13,429	14·77
2,468	29·38	3,135	46·79	1,031	20·62	4,378	49 75	3,333	24 15	919	13 12	28,310	31 14
...	...	...	...	...	..	...	...	...	...	...	...	...	
...	..	...	...	...	...	...	...	...	...	...	...	...	...
...	...	..	...	...	...	...	...	...	...	.	.	...	
...		...	...	...	...	.	...	..	..	...	...	1	·01
...	...	...	...	...	...	...	...	...	...	..	...	1	01
1	·01	...	...	...	...	...	...	...	...	...	...	2	·01
...	...	..	...	...	...	...	. .	. .	...	...	..	8	·01
2	·02	.	...	...	...	...	...	2	·01	..	...	52	05
3	·03	..	...	...	.	...	..	...	..	...	...	153	·16
6	·07	...	...	.	...	...	.	2	·01	...	.	215	23
..	..	...	...	...	...	.	...	...	...	...	. .	...	
...	...	...		...		..	...	...	...	...	...	...	
...	...	1	·01	...	..	...	...	...	...	...	...	16	01
22	·26	1	·01	2	·04	1	·01	1	·01	...	...	117	·12
22	26	2	·02	2	·04	1	·01	1	·01	...	...	123	14
	...	...	...	...	...	.	...	...	...	...	...		...
...	...	...	...	...		.	...	...	...	..	...	...	...
...	...	..	.	...	...	...	.	...				9	·01
2	·02		...	.	...	...	...	.	...	...	. .	26	02
2	·02	...		...	.	.	.	..	..	..	...	35	03
1	·01		.	...	...		...		.	...	..	1	01
2	02	...	...	..			...		...		...	7	01
12	·14		..	...		.		...		3	04	25	04
23	27	...		1	·02		...	2	·01	3	04	149	16
38	·45		..	1	02		.	2	·01	6	·08	202	22
2,536	30·18	3,137	46·82	1,034	20 68	4,379	49·75	3,338	24·18	925	13 21	28,896	31 78

From the above it will be seen that the stock is almost pure chir. In 1874 the dead and dying trees were worked out, the consequence being that middle-aged trees and poles predominate and the crop is full of the highest promise.

Reproduction, owing to the generally moderate grazing, is making steady progress. Advance growth, in the shape of groups of saplings and low poles, is abundant, and even recent seedlings are plentiful in a great many places. The condition of compartment 6, which has been closed against grazing and protected from fire since 1879, and in which the reproduction is almost complete, proves how easily this forest may be regenerated.

Fire conservancy.—The statistics of fire-conservancy since special measures have been undertaken are as follows:—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total. Rs.	a.	p.	Cost. Per acre actually protected. Pies.
1877-78 ...	320	...	...	...	320	85	0	0	51·0
1878-79 ...	320	...	.	...	320	34	5	11	20·9
1879-80 .	320	12	1	12	308	32	1	1	19·9
1880-81 ...	320	...	...	...	320	15	14	11	9·5
1881-82 ...	909	40	1	40	869	63	6	1	14·0
1882-83 ...	909	7	1	7	902	53	4	6	11·3
1883-84 ...	909	...	...	...	909	61	11	7	13·0
1884-85 ...	909	68	2	30	841	36	6	3	8·3
1885-86 ...	909	...	...	...	909	26	6	6	5·5
	5,825	127	5	25	5,698	408	8	10	13·7

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names:—

Name of patti.	Names of villages having rights.	Description of rights. Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghâts.	Limestone.	Bamboos and bâbar.
Malli Dotl.	Jainti	R	R	R	...	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
	Bathar																				
	Jainar																				
	Pandekota	R	R	R	...	...	...	...	...	...	...	R	...	...	R	...	...	...	...	...	...
	Kapina	R	R	R	R	...	...	...	...	...	...	R	...	...	R	...	...	...	...	...	...
	Taurha	R	R	R	R	R	...	R	...	...	...	R	...	...	R	...	...	...	...	...	...
	Matyala	R	R	R	...	R	...	R	...	R	...	...	...	...	R	...	...	...	...	...	...
Malla Siloti.	Airarhi	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Thabla	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Dobapuralia	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Bisua Malla	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Pali Maduli	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Bagwali	R	R	R	...	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
	Tarhi	R	R	R	...	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
	Bisua Talla	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	R	...	...
	Mahyhi	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Siklai	R	R	R	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...
	Khudoli	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
Chat. Gaon.	Tanda	R	R	R	...	...	..	R	R	R	...	...	R	...	R	...	...	...	...	...	...
	Tarsar	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Saroli	R	R	R	...	...	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows :—

No.	Name of patti.	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total
	Malli Doti ...	Jainti	134	6	...	40	180
		Bathur and Jamar ...	100	12	...	34	146
		Pandekota	148	10	...	38	196
		Kapina	54	2	...	26	82
		Taurha	144	20	...	10	174
		Matyala Manihar ...	420	80	...	100	600
	Chaugaon ...	Tánda	304	8	...	24	336
		Tarsiar	250	...	...	36	286
		Saroli	88	10	...	54	152
	Malla Silour ...	Airurhi	54	20	...	10	84
		Thabla	110	28	...	...	138
		Dobapuralia	54	24	...	30	108
		Bisua Malla	68	8	...	36	112
		Pali Maduli	100	6	...	...	106
		Bagwali	110	24	...	30	164
		Tarhi	152	54	...	50	256
		Bisua Talla	108	24	...	12	144
		Maurhi	200	30	...	50	280
		Sirkhai	96	10	...	22	128
		Total ...	2,694	376	...	602	3,672
		Average number per acre ...	3·0	0·4	...	0·7	4·0

As regards trees, the numbers the villagers have actually received on requisition during the past five years are shown in the subjoined statement :—

Forest.	Years.	Chir. Trees.	Chir. Poles.	Oak. Trees.	Oak. Poles.	Miscellaneous. Trees.	Miscellaneous. Poles.	Totals. Trees.	Totals. Poles.	Grand Total.
Ganiádeoli ...	1881-82 ...	14	68	...	...	...	...	14	68	82
	1882-83 ...	20	114	...	...	...	..	20	114	134
	1883-84 .	52	156	...	...	...	..	52	156	208
	1884-85 ...	31	69	...	...	...	...	31	69	100
	1885-86 ...	29	160	...	...	...	...	29	160	180
Total for 5 years ...	...	146	567	...	...	...	...	146	567	713
Average per annum ...	.	29	114	...	...	...	...	29	114	143

From 1871-72, when the forests first came under departmental control, to 1880-81 they were given chír dundárs and bansas as follows :—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundárs	208	136	207	413	108	322	58	46	144	74	1,716
Bansás	73	199	112	180	70	700	414	18	130	93	1,989

Ganiádeoli 1.

Boundaries.—North, south, and west, boundary of forest; east, bridle-road separating compartment from compartment 2.

Area.—136 acres, of which 10 unproductive.

Configuration and aspect.—This compartment occupies the northern face of a small hill, but sweeps round to the right over the eastern end to the southern face close up to the top of the hill and extends for a short distance on that face. The gradients seldom exceed 25°.

Elevation.—Maximum 5,986 feet, minimum 5,650 feet, mean 5,830 feet.

Soil and underlying rock.—A shallow, sandy, dry soil, resting on micaceous schistose sandstone and white quartzite, which often crop out; excellent soil for chír.

Stock.—Mainly chír, which forms a young fairly dense crop on the lower northern slopes. The density diminishes as we ascend the hill and the top of the compartment is nearly blank.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	93	6,975	392	17,640	892	17,840	2,679	21,432	4,056	63,887
Oaks	...	...	2	42	19	171	94	282	115	495
Miscellaneous	...	...	...	...	16	128	78	156	94	284
Total ...	93	6,975	394	17,682	927	18,139	2,851	21,870	4,265	64,666

Reproduction.—Progress satisfactory. Co-efficient of completeness, 0·6.

Accessibility.—In immediate vicinity of cart-road, one mile from commissariat godown.

Ganiádeoli 2.

Boundaries.—North and east, Kota gadhera separating compartment from compartment 3; south, compartments 4 and 5 and village land of Dhâma Ijar; west, boundary of forest and compartment 1.

Area.—103 acres, of which 10 unproductive.

Configuration and aspect.—Westerly slopes drained into the Kota gadhera. Numerous abandoned cultivation terraces exist. Ruling gradients 25° to 30°.

Elevation.—Maximum 5,350 feet, minimum 5,150 feet, mean 5,600 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally an open crop of chír. Above the cart-road there are many blanks; below, the average density is 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	73	5,475	636	28,620	1,361	27,220	671	5,368	2,741	66,683
Oaks ...	...	...	1	21	1	9	8	24	10	54
Miscellaneous	...	...	1	14	6	48	55	110	62	172
Total ...	73	5,475	638	28,655	1,368	27,277	734	5,502	2,813	66,909

Reproduction.—Seedlings, saplings, and low poles are all fairly plentiful. Co-efficient of completeness, 0·5.

Accessibility.—The cart-road traverses the entire length of the compartment one mile from the commissariat godown.

Ganiádeoli 3.

Boundaries.—North, cantonment ; east, village lands outside ; south and west, compartments 2 and 5 and village chak of Dewari.

Area.—70 acres, of which 10 unproductive.

Configuration and aspect.—Fairly uniform south-westerly slopes drained into the Kota gadhera. Ruling gradients 20° to 25°.

Elevation.—Maximum 5,778 feet, minimum 4,900 feet, mean 5,250 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Mainly chír pole forest, with an average density of 0·5. Quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	82	6,150	596	26,820	1,374	27,480	1,317	10,536	3,369	70,986
Oaks	1	72	5	105	28	252	48	144	82	576
Miscellaneous	...	...	4	56	30	240	96	192	130	488
Total ...	83	6,222	605	26,981	1,432	27,972	1,461	10,872	3,581	72,050

Reproduction.—Best along upper edge of compartment, where the saplings and small poles are pushing ahead. Average co-efficient of completeness, 0·5.

Accessibility.—Just below cart-road, one mile from commissariat godown.

Ganiádeoli 4.

Boundaries.—North, compartment 2 ; east, village chak of Dháma Ijar and compartments 5 and 6 ; south and west, boundary of forest.

Area.—103 acres, of which 10 unproductive.

Configuration and aspect.—Westerly slopes drained into the Ko gád. Old cultivation terraces abound. Ruling gradients 20° to 30°.

Elevation.—Maximum 5,700 feet, minimum 4,850 feet, mean 5,250 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally a pole forest of pure chír ; very promising on old cultivation sites, but short-boled elsewhere. Average density 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	75	5,625	504	22,680	1,635	32,700	666	5,328	2,880	66,333
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	2	16	5	10	7	26
Total ...	75	5,625	504	22,680	1,637	32,716	671	5,338	2,887	66,359

Reproduction.—Excellent and well advanced. Co-efficient of completeness, 0·7.

Accessibility.—Traversed by a good bridle-road and just below cart-road about two miles from commissariat godown.

Ganiádeoli 5.

Boundaries.—North, village chak of Dhána Ijar and compartment 2; east, boundary of forest and village chak of Dewari; south, compartment 7; west, compartments 4 and 6.

Area.—84 acres, of which 8 unproductive.

Configuration and aspect.—A straggling figure occupying easterly slopes drained into the Kota gadhera. Rifling gradients 30° to 35°.

Elevation.—Maximum 5,353 feet, minimum 4,750 feet, mean 4,870 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally chír pole forest with a few broad-leaved trees near the gadhera. Average density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	89	6,675	466	20,970	1,030	20,600	883	7,064	2,468	55,309
Oaks	1	72	...	.	2	18	3	9	6	99
Miscellaneous	1	30	2	28	12	96	47	94	62	248
Total ...	91	6,777	468	20,998	1,044	20,714	933	7,167	2,536	55,656

Reproduction.—Mainly recent seedlings. Co-efficient of completeness, 0·4.

Accessibility.—Traversed by a broad bridle-road and just below cart-road, a little more than two miles from the commissariat godown.

Ganiádeoli 6.

Boundaries.—North, compartment 2; east, compartment 5; south, compartment 7; west, compartments 4 and 8.

Area.—67 acres, of which 5 unproductive.

Configuration and aspect.—Easterly slopes above compartment 5 on the same hill side. Gradients gentler than in that compartment.

Elevation.—Maximum 5,376 feet, minimum 5,000 feet, mean 5,180 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—A promising pole forest of chír, which, having been closed and conserved, has been free from fire for several years. Average density 0·5, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	67	5,025	309	13,905	993	19,860	1,766	14,128	3,135	52,918
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	1	8	1	2	2	10
Total ...	67	5,025	309	13,905	994	19,868	1,767	14,130	3,137	52,928

Reproduction.—Nearly complete.

Accessibility.—Just below cart-road, about three miles from commissariat godown.

Ganiádeoli 7.

Boundaries.—North, compartments 5 and 6; east and south, boundary of forest; west, compartment 9.

Area.—50 acres, of which 8 unproductive.

Configuration and aspect.—Easterly slopes, channelled by several gullies running down to the Kota gadhera. Ruling gradients 40° to 35°.

Elevation.—Maximum 5,350 feet, minimum 4,700 feet, mean 5,000 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Nearly pure chír. A deteriorating crop, proved by the abnormally small proportion of poles, the low and crooked trees, and the low average density of 0·3. Quality 0·2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	45	3,375	257	11,565	...	6,200	419	3,352	1,031	24,492
Oaks	...	...	...	...	...	...	...	...	...	.
Miscellaneous	...	...	...	...	...	...	3	6	3	6
Total ...	45	3,375	257	11,565	310	6,200	422	3,358	1,034	24,498

Reproduction.—Co-efficient of completeness barely 0·2.

Accessibility.—About ¾ mile below the cart-road, 4 miles more or less from Commissariat godown.

Ganiádeoli 8.

Boundaries.—North, west, and south, boundary of forest; east, compartments 6, 7, and 9.

Area.—88 acres, of which 5 unproductive.

Configuration and aspect.—With the exception of a narrow belt on the other side of the watershed ridge with a north-westerly aspect, south-easterly and south-westerly slopes forming the head of the basin of the Tarkhet nala. Ruling gradients 25° to 30°.

Elevation.—Maximum 5,320 feet, minimum 5,000 feet, mean 5,200 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—A pole forest of chír. Density 0·5, quality 0·5.

Summary of valuation.

Species.	Girth—class I		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	70	5,250	308	13,860	1,185	23,700	2,815	22,520	4,378	65,330
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	...	. .	1	2	1	2
Total ...	70	5,250	308	13,860	1,185	23,700	2,816	22,522	4,379	65,332

Reproduction.—Kept back by grazing. Average co-efficient of completeness, 0·4.

Accessibility.—On cart-road, 4 miles from commissariat godown.

Ganiádeoli 9.

Boundaries.—North, compartments 8 and 6; east, compartments 7 and 10 and boundary of forest; south and west, boundary of forest.

Area.—138 acres, of which 15 unproductive.

Configuration and aspect.—Two equal portions of westerly slopes drained directly into the Tárkhet gadhera, with a deep, narrow basin of a feeder of the same gadhera between, the sides of which are more or less equally divided between easterly and westerly aspects. Ruling gradients 25° to 30°, but in many places the slopes run up to 40°.

Elevation.—Maximum 5,317 feet, minimum 4,400 feet, mean 4,900 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Pure chír forests. In the southern half the average density is only about 0·2, and the proportion of poles is very small: quality 0·3; in the northern half the average density is not less than 0 5, and poles and young trees predominate: quality 0·6. The larger trees have everywhere suffered from fires and resin-tapping.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	267	20,025	549	24,705	699	13,980	1,818	14,544	3,333	73,25[illegible]
Oaks	...	...	...	...	2	18	...	...	2	1[illegible]
Miscellaneous	...	...	...	...	...	...	3	6	3	[illegible]
Total ..	267	20,025	549	24,705	701	13,998	1,821	14,550	3,338	73,27[illegible]

Reproduction.—In southern half mainly saplings and low poles with a co-efficient of completeness of 0·4; in the northern half principally recent seedlings with a co-efficient of 0·6.

Accessibility.—A mile below cart-road, 4 miles from commissariat godown.

Ganiádeoli 10.

Boundaries—North, west, and south, boundary of forests; west, compartment 9.

Area.—70 acres, of which 14 unproductive.

Configuration and aspect.—Principally exposed easterly, drained directly into the Kota gadhera. Ruling gradients 25° to 30°. There is a stretch of much steeper southerly slopes, inclined to break and slip away where the gadhera sweeps round to the west to meet the Tárkhet gadhera.

Elevation.—Maximum 5,050 feet, minimum 4,400 feet, mean 4,800 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—A very open forest of principally middle-aged and old chír. Average ensity on easterly slopes 0·25, on southerly slopes 0·1.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	154	11,550	222	9,990	148	2,960	395	3,160	919	27,660
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	3	24	3	6	6	30
Total ...	154	11,550	222	9,990	151	2,984	398	3,166	925	27,690

Reproduction.—Mean co-efficient of completeness, 0·3.

Accessibility.—Nearly two miles below cart-road, 4 miles from commissariat godown.

CHAPTER V.—THE CHILIÁNÁO FOREST.

Situation and boundaries.—The following are the parallels of latitude and longitude between which the forest extends :—29°-39′-5″ and 29°-40′-7″ north latitude and 79°-26′-18″ and 79°-28′-18″ east longitude. The Chiliánáo ridge divides it into two almost equal parts, of which that to the east lies in Patti Athágulí Walla of pargana Bára Mandal and the other in Patti Malla Silour of pargana Páli Pachháon. Along its southern edge the forest touches the cantonment for a little more than half a mile. Its other boundaries are village lands.

Area.—618 acres, of which only 69 unproductive.

Number of compartments.—10.

Topography.—The forest sits astride a great spur which is an immediate prolongation of the ridge on which the Ránikhet Cantonment is situated. The spur runs almost due north, and the slopes which form its flanks and which are generally rugged and steep (ruling gradients 30° to 35°) look thus respectively west and east. There are numerous deep ravines and glens and scarps.

Elevation.—Maximum 5,921 feet, minimum 4,400 feet, mean 5,300 feet.

Soil and underlying rock.—The hill is formed exclusively of a micaceous schistose, rather coarse-grained sandstone, which yields a poor light soil ; excellent for chír, especially if bánj is encouraged as a companion.

Stock.—The results of the enumeration survey made are given in the following statement :—

Species.	Diameter class.	Compartment 1, area 31 acres.		Compartment 2, area 48 acres.		Compartment 3, area 67 acres.		Compartment 4, area 80 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	30	·96	14	·29	30	·44	43	·53
	II.	130	4·19	65	1·35	72	1·07	146	1·82
	III.	153	4·93	176	3·66	235	3·50	739	9·23
	IV.	1,542	49·74	1,896	39·50	6,823	101·83	6,199	77·48
Total ...	...	1,855	59·83	2,151	44·81	7,160	106·86	7,127	89·08
Phanáth ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	IV.	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...
Bánj	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	IV.	...	...	...	...	...	...	1	·01
Total ...	...	...	...	...	...	...	...	1	·01
Ayár	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	9	·11
	IV.	7	·22	17	·35	16	·23	78	·97
Total ...	...	7	·22	17	·35	16	·23	87	1·08
Buráns	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	IV.	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...
Miscellaneous ...	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	1	·01	...	...
	IV.	...	...	...	...	19	·28	17	·21
Total ...	...	...	...	...	...	20	·29	17	·21
Average ...	...	1,862	60·01	2,168	45·16	7,196	107·40	7,232	90·40

Compartment 5, area 91 acres.		Compartment 6, area 40 acres.		Compartment 7, area 89 acres.		Compartment 8, area 53 acres.		Compartment 9, area 77 acres.		Compartment 10, area 42 acres.		Entire forest, area 618 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
66	·72	10	·25	18	·20	46	·86	78	1·01	5	·11	340	·37
216	2·37	118	2·95	362	4·06	356	6·71	315	4·09	107	2·54	1,887	2·07
827	9·08	352	8·80	1,301	14·61	377	7·11	679	8·81	699	16·64	5,538	6·09
5,071	55·72	1,035	25·87	1,738	19·52	149	2·81	3,121	40·53	2,550	60·71	30,124	33·13
6,180	67·91	1,515	37·87	3,419	38·41	928	17·50	4,193	54·45	3,361	80·02	37,889	41·68
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
4	·04	...	...	2	·02	...	...	...	...	...	...	6	·01
10	·10	3	·07	8	·09	1	·01	...	...	...	...	23	·02
14	·15	3	·07	10	·11	1	·01	...	...	...	...	29	·03
...	...	...	...	...	...	...	...	...	...	...	...	...	...
2	·02	...	...	...	...	...	...	...	...	...	...	2	·01
6	·06	...	...	14	·15	6	·11	14	·18	1	·02	50	·05
89	·97	6	·15	591	6·64	91	1·71	249	3·23	29	·69	1,173	1·29
97	1·06	6	·15	605	6·79	97	1·83	263	3·41	30	·71	1,223	1·34
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	1	·01	...	...	...	...	...	...	1	·01
2	·02	...	...	...	...	...	...	...	...	...	...	2	·01
5	·05	...	...	3	·03	1	·01	...	...	...	...	10	·01
28	·30	3	·07	73	·82	11	·20	16	·20	...	...	167	·18
35	·38	3	·07	77	·86	12	·22	16	·20	...	...	180	·19
6,326	69·51	1,527	38·17	4,111	46·19	1,038	19·58	4,472	58·07	3,391	80·73	39,323	43·25

The crop is mainly a promising pole forest of pure chír, the few large trees existing being generally stunted and deformed and having on that account escaped removal when the station was formed.

Reproduction.—With a few exceptions, the advance growth must be considered satisfactory, considering the heavy grazing and the recent occurrence of destructive fires. Saplings and low poles are abundant and new seedlings sprinkle the ground in most places.

Fire-conservancy.—The statistics of fire-conservancy since special measures have been undertaken are as follows:—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total.	Cost. Per acre actually protected.
						Rs. a. p.	Pies.
1883-84	618	...	...	...	618	20 4 1	6·3
1884-85	618	2	1	2	616	16 5 8	5·0
1885-86	618	17	1	17	601	16 11 3	5·3
	1,854	19	2	19	1,835	53 4 7	5·6

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names:—

Name of patti.	Names of villages having rights.	Description of rights. Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghâts.	Limestone.	Bamboos and bâlar.
Malla Silour,	Ganwarh	R	R	R	...	R	...	R	...	...	R	...	..	...	R	...	...	...	...	...	...
	Nail	R	R	R	...	R	...	R	...	R	R	...	R	...	R	...	...	...	...	...	...
	Singoli	...	R	R	...	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
	Amyari	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Walla Athaguli.	Kotuli Bisht	R	R	R	R	R	..	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Jhalauri	R	.	...	.	...	...	...	.	...	...	...	...	...	...	...	...	...	...	...	...
	Badhan	R	R	R	R	..	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Walna	R	R	R	..	R	.	R	...	...	...	...	...	..	R	...	..	...	...	..	..
Palla Athaguli.	Sheli Simoli .. .	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	..
	Taili ditto	...	...	R	...	...	...	R	...	...	...	..	...	...	...	...	...	...	...	...	...
	Sattigaon ...	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows:—

Number.	Name of patti	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total.
	Athâguli Walla...	Kotuli Bisht ...	78	...	...	22	100
		Jhalauri ...	330	18	...	96	444
		Badhana ...	312	30	...	122	464
		Walna ...	288	14	...	66	368
	Malla Silour ...	Gawar ...	80	16	...	30	126
			1,088	78	...	336	1,502
		Average number per acre.	1·8	0·1	...	0·5	2·4

As regards trees, the numbers the villagers have actually received on requisition during the past five years are shown in the following statement :—

Forest.	Year.	Chir.		Oak.		Miscellaneous.		Total.		Grand Total.
		Trees.	Poles.	Trees.	Poles.	Trees.	Poles.	Trees.	Poles.	
Chiliánáo	1881-82	...	...	...	...	...	...	...	...	...
	1882-83	3	36	...	...	...	...	3	36	39
	1883-84	4	39	...	...	...	...	4	39	43
	1884-85	1	...	...	...	...	...	1	...	1
	1885-86	...	...	...	...	...	...	...	...	...
Total for 5 years ...	...	8	75	...	...	...	...	8	75	83
Average per annum ...	...	2	15	...	...	...	...	2	15	17

From 1871-72, when the forests first came under departmental control, to 1880-81 they were given chír dundárs and bansás as follows :—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundárs	300	100	150	157	150	158	14	20	226	...	1,255
Bansás	99	78	119	84	75	113	480	25	134	...	1,182

Chiliánáo 1.

Boundaries.—North and west, boundary of forest; east and south, compartment 2.

Area.—31 acres, of which 4 unproductive.

Configuration and aspect.—Westerly slopes with an average gradient of 35° and a few scarps.

Elevation.—Maximum 5,550 feet, minimum 4,900 feet, mean 5,250 feet.

Soil and underlying rock.—Soil dry, shallow, exposing the underlying schistose sandstone at various points everywhere; excellent for chír.

Stock.—Mostly young pole forest of pure chír. Average density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	30	2,250	130	5,850	153	3,060	1,542	12,336	1,855	23,496
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	..	...	...	...	...	7	14	7	14
Total ...	30	2,250	130	5,850	153	3,060	1,549	12,350	1,862	23,510

Reproduction.—In spite of rather heavy grazing there is a sprinkling of recent seedlings everywhere, and saplings and low poles occur in the gaps in the midst of the older growth. Co-efficient of completeness, 0·6.

Accessibility.—Two miles of coolie carriage to a point on cart-road less than a mile from commissariat godown.

Chiliánáo 2.

Boundaries.—North-east, boundary of forest; south, compartments 4 and 3; north-west, compartment 1.

Area.—48 acres, of which 8 unproductive.

Configuration and aspect.—Very rugged south-westerly slopes. Ruling gradient 35° with many scarps.

Elevation.—Maximum 5,763 feet, minimum 4,900 feet, mean 5,250 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—In the lower half as in compartment 1; above that rather more open, with a smaller proportion of poles and generally inferior.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	14	1,050	65	2,925	176	2,520	1,896	15,168	2,151	22,663
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	...	...	17	34	17	34
Total ...	14	1,050	65	2,925	176	2,520	1,913	15,202	2,168	22,697

Reproduction.—In the lower half as in compartment 1; in the upper half not so advanced owing to rather heavy grazing.

Accessibility.—About half a mile less of coolie carriage than from compartment 1.

Chiliánáo 3.

Boundaries.—North and east, boundary of forest and compartments 2 and 4; south, compartment 5 and boundary of forest; west, boundary of forest.

Area.—67 acres, of which 10 unproductive.

Configuration and aspect.—Westerly slopes as steep and as rugged as in compartment 2.

Elevation.—Maximum 5,250 feet, minimum 4,600 feet, mean 5,000 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Fuller than in compartment 1 and containing a very much larger proportion of poles.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	30	2,250	72	3,240	235	4,700	6,823	54,584	7,160	64,774
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	1	8	35	70	36	78
Total ...	30	2,250	72	3,240	236	4,708	6,858	54,654	7,196	64,852

Reproduction.—As in compartment 1, but would be much better were it not for the rather heavy grazing.

Accessibility.—The same as for compartment 2.

Chiliánáo 5.

Boundaries.—North, compartment 2; east, boundary of forest; south, compartment 5; west, compartment 3.

Area.—80 acres, of which 12 unproductive.

Configuration and aspect.—As in compartment 2.

Elevation.—Maximum 5,921 feet, minimum 5,000 feet, mean 5,500 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—About two-fifths of the area towards the south are very bare and full of blanks. The rest is rather superior to the stock in compartment 1, and owing to greater elevation a little oak and ayár come in.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	43	3,225	146	6,570	739	14,780	6,199	49,592	7,127	74,167
Oaks	...	...	...	...	...		1	3	1	3
Miscellaneous	...	...	...	...	9	72	95	190	104	262
Total ...	43	3,225	146	6,570	748	14,852	6,295	49,785	7,232	74,432

Reproduction.—Unsatisfactory in badly-stocked portion owing to heavy grazing, but elsewhere generally as in compartment 1.

Accessibility.—About of 6¼ miles of coolie carriage to cart-road and one mile thence by cart.

Chiliánáo 5.

Boundaries.—North, compartments 3 and 4; east, compartment 6; south and west, boundary of forest.

Area.—91 acres, of which 7 unproductive.

Configuration and aspect.—More or less uniform slopes of gradients, varying generally from 25° to 35°. As the contours sweep round from south to south-east, the aspect changes from west to south-west, the latter outlook predominating.

Elevation.—Maximum 5,921 feet, minimum 5,250 feet, mean 5,550 feet.

Soil and underlying rock.—Rather deeper and less seldom absent than in compartment 1.

Stock.—As in the better portion of compartment 4, but rather more open and slightly older.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chir	66	4,950	216	9,720	827	16,540	5,071	40,568	6,180	71,778
Oaks	...	...	...	...	4	36	10	30	14	66
Miscellaneous	...	...	4	56	11	88	117	234	132	378
Total ...	66	4,950	220	9,776	842	16,664	5,198	40,832	6,326	72,222

Reproduction.—Co-efficient of completeness, 0·5. Mainly saplings and low poles.

Accessibility—About half a mile less coolie carriage than from compartment 4.

Chiliánáo 6.

Boundaries.—North and south, boundary of forest; east, compartment 7; west, boundary of forest and compartment 5.

Area.—40 acres, of which 4 unproductive.

Configuration and aspect.—Mainly westerly, slopes channelled by numerous ravines and gullies. Ruling gradients 30° to 35°.

Elevation.—Maximum 5,921 feet, minimum 5,400 feet, mean 5,680 feet.

Soil and underlying rock.—As in compartment 5.

Stock.—Barring some blanks, as in compartment 5, but with a smaller proportion of large trees and poles, which have probably been cut out for villagers' use, the average density being thereby reduced to only 0 4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chir	10	750	118	5,310	352	7,040	1,035	8,280	1,515	21,380
Oaks	...	...	...	...	...	...	3	9	3	9
Miscellaneous	...	...	...	...	...	...	9	18	9	18
Total ...	10	750	118	5,310	352	7,040	1,047	8,307	1,527	21,407

Reproduction.—As in compartment 5.

Accessibility.—On cart-road about a mile from commissariat godown.

Chiliánáo 7.

Boundaries.—North, compartment 9; east and south, compartment 8 and cantonment; west, compartment 6.

Area.—89 acres, of which 8 unproductive.

Configuration and aspect.—Ground of very peculiar conformation. The whole compartment is enclosed between two converging scarcely-branched streams that merely form two simple ravines or gullies, and most of the triangle between them is occupied by the broad open basin of a third much-branched stream which meets one of the two former. The left-hand portion of this basin consists of uniform easterly

slopes with more or less straight contours and a ruling gradient of about 20°. Everywhere else (rather more than half the compartment) the slopes have rounded contours, have a north-easterly aspect, and are rather steeper, especially at the bottom.

Elevation.—Maximum 5,870 feet, minimum 5,180 feet, mean 5,500 feet.

Soil and underlying rock.—Soil shallow, resting on micaceous schistose, coarse-grained sandstone; excellent for chír.

Stock.—Mainly a chír pole forest. Mean density 0·5, quality 0·3, the trees being stunted and crooked.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	18	1,350	362	16,290	1,301	26,020	1,738	13,904	3,419	57,564
Oaks	...	...	...	...	2	18	8	24	10	42
Miscellaneous	1	30	...	...	17	136	664	1,328	682	1,494
Total ...	19	1,380	362	16,290	1,320	26,174	2,410	15,256	4,111	59,100

Reproduction.—Co-efficient of completeness, 0·3. Proportion of recent seedlings small owing to heavy grazing.

Accessibility.—Just below cart-road, one mile from commissariat godown.

Chiliánáo 8.

Boundaries.—North-east and south, boundary of forest; west, bridle-road to Dwárahát, separating compartment from compartments 7 and 9.

Area.—53 acres, of which 5 unproductive.

Configuration and aspect.—Mainly easterly and north-easterly, slopes composing the lower portion of the deep and rugged basins of the Káli gád and Rebka Kachera, which, meeting, form the Nawa gád. Ruling gradients 30° to 35°, but steeper slopes and even scarps not uncommon.

Elevation.—Maximum 5,200 feet, minimum 4,400 feet, mean 4,900 feet.

Soil and underlying rock.—As in compartment 7.

Stock.—Extremely wretched open forest of principally middle-aged chír. Mean density barely 0·2, quality 0·1.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	46	3,450	356	16,020	377	7,540	149	1,192	928	28,202
Oaks	...	...	...	...	...	..	1	3	1	3
Miscellaneous	...	...	...	...	7	56	102	204	109	260
Total	46	3,450	356	16,020	384	7,596	252	3,399	1,038	28,465

Reproduction.—Very backward (mean co-efficient 0·2) owing to heavy grazing and a recent destructive fire.

Accessibility.—Just below the Dwárahát bridle-road, about two miles from commissariat godown.

Chiliánáo 9.

Boundaries.—North, compartment 10 and boundary of forest; east, compartment 8; south, compartment 7; west, compartment 6 and boundary of forest.

Area.—77 acres, of which 6 unproductive.

Configuration and aspect.—Mainly easterly and north-easterly slopes, channelled by several ravines. Ruling gradients 28° to 33°.

Elevation.—Maximum 5,910 feet, minimum 4,979 feet, mean 5,550 feet.

Soil and underlying rock.—As in compartment 7.

Stock.—Chiefly a forest of chír poles, which are fairly well grown, although the older trees are stunted and ill-shaped. Mean density 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	78	5,850	315	14,175	679	13,580	3,121	24,968	4,193	58,573
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	14	112	265	530	279	642
Total ...	78	5,850	315	14,175	693	13,692	3,386	25,498	4,472	59,215

Reproduction.—Co-efficient of completeness, 0·3. Principally saplings and low poles, the more recent seedlings having been nearly all destroyed by the same fire that swept through compartment 8.

Accessibility.—On Dwáráhát bridle-road, about 2½ miles from commissariat godown.

Chiliánáo 10.

Boundaries.—North, east, and west, forest boundary; south, compartment 9.

Area.—42 acres, of which 5 unproductive.

Configuration and aspect.—Fairly uniform, easterly slopes with a mean gradient of 20°.

Elevation.—Maximum 5,400 feet, minimum 4,880 feet, mean 5,200 feet.

Soil and underlying rock.—As in compartment 7, but deeper and moister in the lower portions of the compartment, where water comes out at the surface.

Stock.—Leaving out a few blanks, the stock is rather fuller and of a younger type than that in compartment 9; quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	5	375	107	4,815	699	13,980	2,550	20,400	3,361	39,570
Oaks ...	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	1	8	29	58	30	66
Total ...	5	375	107	4,815	700	13,988	2,579	20,458	3,391	39,636

Reproduction.—Very much better than in compartments 8 and 9. Co-efficient of completeness, 0 6.

Accessibility.—Nearly half mile above Dwárahát bridle-road, three miles from commissariat godown.

CHAPTER VI—THE KÁRCHÚLI FOREST.

Situation and boundaries.—This forest, lying to the north of Chiliánáo, forms a sort of parallelogram, extending between 29°-40′-9″ and 29°-41′-18″ north latitude and 79°-27′-6″ and 79°-27′-52″ east longitude. It is situated entirely in Patti Athágulí of pargana Bára Mandal. It is surrounded on every side by village lands.

Area.—216 acres, of which 14 unproductive.

Number of compartments—3.

Topography.—The forest stretches along the irregular easterly slopes forming the right flank of a large offshoot of the same spur on which the Chiliánáo forest is situated. The ruling gradients are 20° to 25°, but many slopes are very much steeper, without, however, ever being scarped. The entire drainage is into the Walna gád, a small feeder of the Gaggás river, which is itself a tributary of the Rámganga.

Elevation.—Maximum 5,040 feet, minimum 4,350 feet, mean 4,700 feet.

Soil and underlying rock.—The backbone of the spur is formed of quartzite, the flank being composed of micaceous schistose, rather coarse-grained sandstone, which disintegrates very easily, forming a light poor, soil, excellent for chír.

Stock.—The results of the enumeration survey of the trees are recorded below :—

Species.	Diameter class.	Compartment 1, area 53 acres. Gross number of trees.	Compartment 1, area 53 acres. Number of trees per acre.	Compartment 2, area 73 acres. Gross number of trees.	Compartment 2, area 73 acres. Number of trees per acre.	Compartment 3, area 90 acres. Gross number of trees.	Compartment 3, area 90 acres. Number of trees per acre.	Entore forest, area 216 acres. Gross number of trees.	Entore forest, area 216 acres. Number of trees per acre.
Chír	I.	122	2·30	325	4·45	327	3·63	774	3·58
	II.	201	3·79	390	5·34	484	5·37	1,075	4·97
	III.	337	6·35	413	5·65	719	7·98	1,469	6·80
	IV.	3,486	65·77	1,079	14·78	1,436	15·95	6,001	27·78
Total ...	...	4,146	78·22	2,207	30·23	2,966	32·95	9,319	43·14
Phanda	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	VI.	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...
Bánj	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	IV.	1	·01	...	...	...	...	1	·01
Total ...	...	1	·01	...	...	...	...	1	·01
Ayár	I.	...	...	...	...	...	...	...	...
	II,	...	...	...	...	...	...	...	...
	III.	3	·05	1	·01	1	·01	5	·02
	IV.	27	·50	13	·17	19	·21	59	·27
Total ...	...	30	·56	14	·19	20	·22	64	·29
Buráns	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...
	IV.	...	...	...	...	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...
Miscellaneous	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...
	III.	1	·01	...	...	...	...	1	·01
	IV.	1	·01	1	·01	3	·03	5	·02
Total ...	...	2	·03	1	·01	3	·03	6	·02
Grand Total ...	...	4,179	78·84	2,222	30·43	2,989	33·21	9,390	43·47

The crop comprises essentially a pure chír pole forest, with some slightly older patches; most of the trees are very badly subject to the malformation known as twisted fibre.

Reproduction.—Advance growth, in the shape of saplings and small poles, is fairly abundant, but recent seedlings are not numerous owing to the heavy grazing.

Fire conservancy.—The statistics of fire conservancy, since special measures have been undertaken, are as follows :—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total.	Cost. Per acre actually protected.
						Rs. a. p.	Pies.
1884-85	216	...	...	...	216	3 7 6	3·1
1885-86	216	...	...	...	216	...	0·0
Total ...	432	...	...	...	432	3 7 6	1·6

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names :—

Name of patti.	Names of villages having rights.	Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghâts.	Limestone.	Bamboos and bíbar.
	Kárchúli ...	R	R	R	R	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kotuli Panth ...	R	R	R	R	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Walna ...	R	R	R	...	R	...	R	...	...	...	...	...	...	R		...	...	...	...	...
	Darmarh ...	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Koteura ...	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows :—

No.	Name of patti.	Mauza	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total.
	Athaguli Walla ...	Kárchúli	314	28	...	214	556
		Kotuli Panth	168	30	...	38	236
		Walna	288	14	...	66	368
	Ditto Palla ...	Darmarh, Koteura	The number of cattle allowed to graze is not entered, although these villages apparently enjoy the right of free pasture according to the printed list of privileged villages.				
			770	72	...	318	1,160
		Average number per acre ...	3·6	0·3	...	1·5	5·4

As regards trees, the numbers the villagers have actually received on requisition during the past five years are shown in the subjoined statement :—

Forest.	Year.	Chir.		Oak.		Miscellaneous.		Total.		Grand Total.
		Trees.	Poles.	Trees.	Poles.	Trees.	Poles.	Trees.	Poles.	
Kárchúli ...	1881-82	...	...	...	...	...	...	...	...	...
	1882-83	4	162	...	...	...	...	4	162	166
	1883-84	...	...	..	...	...	...	...	...	...
	1884-85	2	24	...	...	...	...	2	24	26
	1885-86	3	141	...	...	...	...	3	141	144
Total for 5 years ...	...	9	327	...	...	...	..	9	327	336
Average per annum ...	...	2	65	...	...	...	...	2	65	67

From 1871-72, when the forests first came under departmental control, to 1880-81 they were given chír dundárs and bansás as follows :—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78	1878-79.	1879-80.	1880-81.	Total.
Dundárs ...	...	15	...	50	23	40	...	9	...	22	140
Bansás ...	...	1½	...	17	13	57	...	39	18	25	141

Kárchúli 1.

Boundaries.—North, compartment 2 ; east, south, and west, boundary of forest.

Area.—53 acres, of which 3 unproductive.

Configuration and aspect.—Mainly easterly slopes with a ruling gradient of 20°.

Elevation.—Maximum 4,900 feet, minimum 4,500 feet, mean 4,750 feet.

Soil and underlying rock.—A shallow soil, resting on micaceous schistose, rather coarse-grained sandstone and quartzite ; excellent for chír.

Stock.—Mainly a pure chír pole forest, distributed in dense patches with narrow blanks and glades between. Quality 0·5. On the most northerly spur the stock is older, but the trees are very badly deformed by twisted fibre.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	122	9,150	201	9,045	337	6,740	3,486	27,888	4,146	52,823
Oaks	...	...	...	...	...	..	1	9	1	9
Miscellaneous	...	...	...	...	4	32	28	56	32	88
Total ...	122	9,150	201	9,045	341	6,772	3,515	27,953	4,179	52,920

Reproduction.—Mean co-efficient of completeness, 0 4, mainly saplings and small poles.

Accessibility.—About half mile above Dwárahát bridle-road, 3½ miles from commissariat godown.

Kárchúli 2.

Boundaries.—North, compartment 3; east and west, boundary of forest; south, compartment 1.

Area.—74 acres, of which 5 unproductive.

Configuration and aspect.—Mainly north-easterly slopes with zigzag contours. In the upper half the ruling gradient is 28°, but lower down the slopes reach even 35°.

Elevation.—Maximum 5,040 feet, minimum 4,420 feet, mean 4,800 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Resembles very much that in the northern portion of compartment 1, the twisted fibre affecting even the poles.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	325	24,375	390	17,550	413	8,260	1,079	8,632	2,207	58,817
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	1	8	14	28	15	36
Total ...	325	24,375	390	17,550	414	8,268	1,093	8,660	2,222	58,853

Reproduction.—Mean co-efficient of completeness, 0·4; principally saplings and low poles.

Accessibility.—About ¾ mile above Dwárábát bridle-road, four miles from commissariat godown.

Kárchúli 3.

Boundaries.—North, east, and west, boundary of forest; south, compartment 2.

Area.—90 acres, of which 6 unproductive.

Configuration and aspect.—North-easterly slopes channelled by numerous gullies and ravines; ruling gradients 20° to 25°.

Elevation.—Maximum 4,900 feet, minimum 4,350 feet, mean 4,650 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—As in compartment 2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	327	24,525	484	21,780	719	14,380	1,436	11,488	2,966	72,173
Oaks	...	...	...	...	...	...	...	...	...	...
Miscellaneous	...	...	...	...	1	8	22	44	23	52
Total ...	327	24,525	484	21,780	720	14,388	1,458	11,532	2,989	72,225

Reproduction.—As in compartment 2.

Accessibility.—About half a mile further from the Dwárábát bridle-road than compartment 2.

CHAPTER VII.—THE PADHÓLI FOREST.

Situation and boundaries.—This forest lies between 29°-38′-45½″ and 29°-40′-52″ north latitude and 79°-28′-53″ and 79°-31′-3″ east longitude. It is situated entirely in patti Uttáguli of pargana Bára Mandal. For 1½ miles its boundary marches with that of the Ránikhet cantonment and for 1⅛ miles with that of the cantonment lands of Upat. For an aggregate length of 1¼ miles the northern edge of Ránikhet reserve runs parallel with its south-eastern boundary, the Ránikhet-Almora road intervening. All the remaining boundaries are village lands.

Area.—944 acres, of which 80 unproductive.

Enclosed village lands.—Two chaks, Ritá khanera and Bhábila khet, measuring respectively 3·2 and 2 acres.

Number of compartments.—15.

Topography.—The forest extends over the northerly and north-westerly slopes just below the cantonment and Ránikhet reserve from opposite the Ránikhet staging bungalow to past the cantonment lands of Upat and running down from the Ránikhet-Almora road, which for the most part follows the watershed line between the Gaggás and Ulábhága stream basins. They comprise the headwaters of numerous feeders of the Gaggás. The ground contours are generally round and the surface falls in broad steps or terraces. The gradients seldom exceed 30°, and slopes of 20° are not uncommon.

Elevation.—Maximum 5,700 feet, minimum 4,400 feet, mean 5,000 feet.

Soil and underlying rock.—The rock-formation consists almost exclusively of easily disintegrating mica schists, which constitute a good subsoil and yield a fine sandy soil lying to a sufficient depth on all slopes up to 25° and suited to agricultural cultivation over the greater portion of the area. An excellent soil for chír, especially where the altitude is sufficient to allow bánj to enter as an under-story. At the western extremity the underlying rock is a schistose gneiss, which yields soil similar to the true schists.

Stock.—The following is a summary of the enumeration surveys :—

Species.	Diameter class.	Compartment 1, area 31 acres.		Compartment 2, area 16 acres.		Compartment 3, area 47 acres.		Compartment 4, area 62 acres.		Compartment 5, area 64 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	10	·32	1	·06	24	·50	9	·14	19	·29
	II.	26	·8	9	·56	54	1·14	31	·5	65	1·01
	III.	139	4·45	61	3·81	104	2·19	299	4·80	484	7 53
	IV.	1,716	55·35	428	26·75	2,917	62·06	3,287	53·01	4,640	72·50
Total ...	...	1,891	60·96	499	31·18	3,099	65·91	3,626	58·46	5,208	81·34
Bánj	I.	...	...	7	·43	...	...	...	...	2	·03
	II.	4	·12	4	·25	...	...	2	·03	5	·07
	III.	9	·29	15	·93	6	·12	4	·06	30	·46
	IV.	21	·67	56	3·50	11	·23	7	·11	159	2·48
Total ...	...	34	1·09	82	5·12	17	·36	13	·20	196	3·06
Phauáth	I.	...	...	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...	...	...
	IV.	1	·03	...	...	...	...	...	...	...	...
Total ...	...	1	·03	...	...	...	...	...	...	...	...
Ayár	I.	...	...	...	...	...	...	...	...	1	·01
	II.	1	·03	1	·06	...	...	1	·01	4	·06
	III.	8	·25	19	1·18	3	·06	4	·06	23	·35
	IV.	22	·72	85	5·31	35	·74	34	·54	206	3·21
Total ...	...	31	1·00	105	6·56	38	·80	39	·62	234	3·65
Buráus	I.	...	...	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...	2	·03
	IV.	3	·09	8	·50	...	...	4	·06	24	·37
Total ...	...	3	·09	8	·50	...	...	4	·06	26	·40
Kokhat	I.	...	...	...	...	...	...	...	...	8	·12
	II.	...	...	1	·06	...	...	...	...	16	·25
	III.	1	·03	1	·06	...	...	...	...	51	·79
	IV.	7	·22	63	3·93	9	·18	36	·58	374	5·84
Total ...	...	8	·25	65	4·06	9	·18	36	·58	449	7·01
Average ...	...	1,967	63·77	759	47·43	3,162	67·27	3,717	59·95	6,111	95·48

Species.	Diameter class.	Compartment 6, area 56 acres.		Compartment 7, area 68 acres.		Compartment 8, area 81 acres.		Compartment 9, area 83 acres.		Compartment 10, area 55 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	27	·48	43	·63	124	1·53	107	1·29	267	4·85
	II.	58	1·03	122	1·79	396	4·88	281	3·38	520	9·45
	III.	332	5·91	351	3·67	433	5·33	439	5·27	563	10·20
	IV.	2,823	50·41	3,162	46·50	1,856	22·91	2,611	31·45	185	3·36
Total ...	...	3,240	57·83	3,578	52·60	2,809	34·66	3,438	41·40	1,535	27·87
Bánj ...	I.	1	·01	3	·04	2	·02	...	...	...	...
	II.	3	·05	7	·10	1	·01	...	...	...	...
	III.	30	·53	77	1·13	3	·03	...	...	...	...
	IV.	149	2·58	44	·64	22	·27	...	...	...	...
Total ...	...	183	3·26	131	1·92	28	·34	...	...	...	...
Phanáth ...	I.	...	...	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...	...	...
	IV.	...	...	1	·01	2	·02	...	...	...	...
Total ...	...	...	...	1	·01	2	·02	...	...	...	..
Ayár ..	I.	...	...	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...	...	.
	III.	3	·05	2	·02	22	·27	2	·02	9	·16
	IV.	86	1·53	56	·82	111	1·37	9	·10	13	·23
Total ...	...	89	1·58	58	·88	133	1·64	11	·13	22	·40
Buráns ...	I.	...	...	...	...	...	...	...	...	...	..
	II.	...	...	...	...	...	...	...	...	...	...
	III.	1	·01	...	...	...	...	...	...	...	...
	IV.	11	·19	1	·01	2	·02	1	·01	...	...
Total ...	...	12	·21	1	.01	2	·02	1	·01	..	...
Miscellaneous ...	I.	2	·03	1	·01	...	...	...	...	1	·01
	II.	10	·17	6	.08	...	...	...	...	1	·01
	III.	71	1·26	21	·30	18	·22	2	·02	1	·01
	IV.	361	6·44	182	2·67	80	·98	2	·02	2	·03
Total ...	...	444	7·92	210	3·08	98	1·20	4	·04	5	·07
Average ...	...	3,967	70·83	3,978	58·50	3,071	37·91	3,453	41·60	1,560	28·34

Compartment 11, area 45 acres.		Compartment 12, area 56 acres.		Compartment 13, area 102 acres.		Compartment 14, area 91 acres.		Compartment 15, area 87 acres.		Entire forest, area 944 acre.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
32	·71	24	·42	12	·11	53	·58	77	·88	829	·87
374	8·31	119	2·12	113	1·10	226	2·40	293	3·36	2,687	2·84
749	16·65	440	7·83	748	7·30	362	3·96	411	4·71	5,815	6·15
473	10·51	2,396	42·78	3,180	31·17	3,836	42·15	3,130	35·97	36,640	38·81
1,628	36·18	2,079	53·17	4,053	39·70	4,477	49·18	3,911	44·95	45,971	48·69
...	...	4	·07	13	·12	8	·08	2	·02	42	·04
...	...	8	·14	23	·23	18	·19	12	·13	87	·09
...	...	36	·64	64	·62	68	·70	44	·50	386	·40
8	·17	170	3·05	291	2·86	304	3·35	129	1·48	1,371	1·45
8	·17	218	3·91	391	3·85	398	4·38	187	2·14	1,886	1·98
...	...	...	...	...	...	...	...	...	...	...	.
...	...	...	...	..	...	...	...	...	...	...	..
...	...	...	...	...	...	...	...	..	...	...	..
...	...	...	...	...	...	...	...	...	...	4	·01
...	...	...	...	...	...		...	...	...	4	·01
...	...	1	·01	...	...	...	...	...	...	2	·04
...	...	1	·01	1	·01	1	·01	...	...	10	·30
...	...	16	·28	14	·13	6	·06	27	·31	158	·12
8	·17	220	3·92	189	1·85	152	1·67	254	2·91	1,480	1·27
8	·17	238	4·25	204	1·99	159	1·74	281	3·22	1,650	1·76
...	...	...	...	...	...	...	...	...	...	...	·04
...	...	...	...	2	·01	...	...	1	·01	2	·01
...	...	1	·01	2	·01	6	·06	5	·05	17	·06
...	...	13	·22	9	·08	15	·16	18	·20	109	·01
...	..	14	·25	13	·12	21	·23	24	·27	129	·13
1	·02	2	·03	2	·01	...	...	...	...	17	·02
...	...	6	·10	4	·03	3	·03	3	·03	50	·05
3	·06	45	·80	37	·36	34	·37	6	·06	291	0·31
6	·13	272	4·85	543	5·32	541	...	71	·81	2,549	2·70
10	·22	325	5·80	586	5·74	578	5·95	80	·01	2,907	3·08
1,651	36·68	3,774	67·39	5,246	51·43	5,633	61·90	4,482	51·51	52,531	55·65

This is essentially a chír forest, with bánj in mixture above 5,000 feet of elevation, and belts of broad-leaved species, principally bánj, ayár, alder, káphal, and mehal, lining the ravines and deeper gullies. The greater portion of the crop is in the pole stage and is growing up well, although slowly, in spite of the heavy grazing; but the older pines are very badly affected with twisted fibre, there being often one revolution in a single foot of height.

Reproduction is on the whole excellent. Saplings and low poles of chír are abundant in most parts and often form a complete advance growth in larger or smaller patches; but the grazing and lopping are against the rapid extension of the advance growth, especially of bánj, of which there is hardly a single capable seed-bearer in the whole forest, although the numerous low bushes of that species attest its former general distribution at most points above 5,000 feet.

Fire-conservancy.—The statistics of fire-conservancy, since special measures were undertaken, are as follows:—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total.	Cost. Per acre actually protected.
						Rs. a. p.	Pies.
1881-82 ...	944	2	1	2	942	57 1 8	1·1
1882-83 ...	944	...	...	...	944	40 12 8	8·2
1883-84 ...	944	119	2	59	825	55 15 7	13·0
1884-85 ...	944	18	1	18	926	20 8 0	4·2
1885-86 ...	944	...	...	...	944	19 7 6	3·9
Total ...	4,720	139	4	35	4,581	193 13 5	7·4

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names:—

Name of patti.	Names of villages having rights.	Description of rights. Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghát.	Limestone.	Bamboos and bábar.
Walla Athagulli.	Makro Malla ...	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Chowkuni ...	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Aior ...	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Jaintha ...	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Kalora ...	R	R	R	R	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Khanya .	R	R	R	R	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Magchowra ..	R	R	R	R	R	...	R	R	R	...	...	...	...	R	...	...	...	...	...	...
	Mawna ...	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Airoli ...	R	R	R	R	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...
	Pipaltána ...	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Chamna ...	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Binoli ...	...	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Rost.	Jánah ...	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Reonigaon ...	R	R	R	R	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
	Batulia ...	R	R	R	R	...	...	...	...	...	R	...	...	...	R	...	...	...	...	...	...
	Sungar Khál ...	R	R	R	R	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
Palla Atha-gulli.	Matela ...	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Manela ...	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Airarlii ...	...	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows :—

Number.	Name of patti.	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total.
	Reoni ...	Jánáh ...	138	...	...	98	236
		Reonigaon ...	786	70	...	404	1,260
		Batulia ...	96	...	...	88	184
		Sungur Khál ...	168	10	...	132	310
	Athágulí Walla.	Makro Walla ...	104	2	...	64	170
		Chowkunni ...	290	...	...	126	416
		Airarhi ...	340	28	...	236	604
		Jaintha ...	22	6	...	22	50
		Kalora ...	94	10	...	64	168
		Khania ...	244	4	...	110	358
		Muagchora ...	360	18	...	276	654
		Mawna ...	280	20	...	164	464
		Airoli ...	150	2	...	150	302
		Pipaltána ...	170	4	...	30	204
		Chamna ...	110	...	...	26	136
			3,352	174	...	1,990	5,516
		Average number per acre,	3·6	0·2	...	2·1	5·08

As regards trees, the numbers the villagers have actually received on requisition during the past five years are shown in the subjoined statement :—

Forest.	Year.	Chir. Trees.	Chir. Poles.	Oak. Trees.	Oak. Poles.	Miscellaneous. Trees.	Miscellaneous. Poles.	Total. Trees.	Total. Poles.	Grand Total.
Padholi ...	1881-82	10	98	...	...	...	...	10	98	108
	1882-83	33	426	...	...	...	...	33	426	459
	1883-84	60	624	...	27	...	...	60	651	711
	1884-85	16	71	...	...	...	...	16	71	87
	1885-86	34	652	...	...	...	...	34	652	686
Totals for five years...		153	1,871	...	27	...	...	153	1,898	2,051
Average per annum ...		31	374	...	5	...	...	31	379	410

From 1871-72, when the forests first came under departmental control, to 1880-81 they were given chír dundárs and bansás as follows :—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundárs ...	178	147	200	218	100	788	126	..	197	113	2 067
Bansás ...	48	103	103	112	63	656	1,206	11	196	146	2,633

Padholi 1.

Boundaries.—North, boundary of forest and compartment 2 ; east, south, and west, boundary of forest (cantonment).

Area.—31 acres, of which 3 unproductive.

Configuration and aspect.—The extremity of a long spur sweeping here from east to west. There is flat ground along the crest. About two-thirds of the area face the north-west and the remainder west, south, or south-east. Ruling gradients 25° to 35°.

Elevation.—Maximum 5,680 feet, minimum 5,220 feet, mean 5,500 feet.

Soil and underlying rock.—As in compartment 2.

Stock.—A young pole forest of nearly pure chír; but low, degraded bánj coppice is struggling up in places. Mean density 0·7, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	10	750	26	1,170	138	2,760	1,716	13,728	1,890	18,408
Oaks	...	...	4	84	9	81	21	63	34	228
Miscellaneous	...	...	1	14	9	72	33	66	42	152
Total ...	10	750	31	1,268	156	2,913	1,770	13,857	1,967	18,788

Reproduction.—Recent seedlings almost *nil;* saplings and low poles of chír very abundant in patches, and degraded oak bushes as already mentioned. Co-efficient of completeness, 0·4.

Accessibility.—Just below cart-road, two miles from commissariat godown.

Padholi 2.

Boundaries.—North, compartment 3 (sot); east, cantonment with Almora-Ránikhet cart-road between; south, compartment 1 (sot); west, Khaniagáon village lands (forest boundary).

Area.—16 acres, of which 1 unproductive.

Configuration and aspect.—Westerly slopes of gradients varying from 12° to 25°, channelled by several small, dry watercourses.

Elevation.—Maximum 5,700 feet, minimum 5,300 feet, mean 5,530 feet.

Soil and underlying rock.—Soil sandy, largely micaceous, dry, shallow, but a splendid forest soil under constant leaf canopy, resting on crumbling schistose gneiss; excellent for both chír and bánj.

Stock.—Chiefly a young pole forest chír, with an under-story of degraded oak coppice, able to fill up every gap, if grazing and lopping are stopped Stock complete in places. Mean density 0·6, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	1	75	9	405	61	1,220	428	3,424	499	5,124
Oaks	7	504	4	84	15	135	56	168	82	891
Miscellaneous	...	...	2	28	20	160	156	312	178	500
Total ...	8	579	15	517	96	1,515	640	3,904	759	6,515

Reproduction.—Recent seedlings almost *nil;* saplings of chír fairly plentiful; low coppice of bánj, as said above, very abundant. Co efficient of completeness, 0·8.

Accessibility.—Just below cart-road, 2¼ miles from commissariat godown.

Padholi 3.

Boundaries.—North and east, compartments 4 and 5 and cantonment separated by Almora-Ránikhet cart-road; south, compartment 2 (sot) and forest boundary; west, forest boundary.

Area.—47 acres, of which 4 unproductive.

Configuration and aspect.—Westerly slopes of a long spur running out north, with gradients varying from 16° to 35° (few under 20°), and channelled by a few gullies and watercourses.

Elevation.—Maximum 5,700 feet, minimum 4,800 feet, mean 5,200 feet.

Soil and underlying rock.—As in compartment 2, although generally shallower, often exposing the underlying schists; excellent for chír; not enough of it everywhere for bánj.

Stock.—A young pole forest of nearly pure chír, with some pretty low bánj coppice on old cultivation sites at upper end. Leaving out aggregate blank area of 10 acres, mean density 0·5, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	24	1,800	54	2,430	103	2,060	2,917	23,336	3,098	29,626
Oaks	...	...	...	...	6	54	11	33	17	87
Miscellaneous	...	...	...	...	3	24	44	88	47	112
Total ...	24	1,800	54	2,430	112	2,138	2,972	23,457	3,162	29,825

Reproduction.—In open places a sprinkling of chír seedlings; elsewhere abundant saplings and low poles. Mean co-efficient of completeness, 0·4.

Accessibility.—Just below cart-road, 2¼ miles from commissariat godown, but extending for nearly ¾ mile down the slope.

Padholi 4.

Boundaries.—North, forest boundary; east, compartment 5; south and west, compartment 3.

Area.—62 acres, of which 4 unproductive.

Configuration and aspect.—Slopes as in compartment 3, but with a northerly aspect, forming for the most part the opposite face of the same spur.

Elevation.—Maximum 5,600 feet, minimum 4,800 feet, mean 5,270 feet.

Soil and underlying rock.—As in compartment 3.

Stock.—As in compartment 3, but more complete.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	9	675	31	1,395	298	5,960	3,287	26,296	3,625	34,326
Oaks	...	...	2	42	4	36	7	21	13	99
Miscellaneous	...	...	1	14	4	32	74	148	79	194
Total ...	9	675	34	1,461	306	6,028	3,368	26,465	3,717	34,619

Reproduction.—Saplings and low poles of chír very numerous, but little room left for new reproduction.

Accessibility.—A little more than ½ mile below cart-road, whence 2¼ miles from commissariat godown.

Padholi 5.

Boundaries.—North, forest boundary (village lands); east, compartment 6 and Chambu cultivation chak; south, forest boundary (cantonment and Ráuikhet reserve); west, compartment 4 and forest boundary (village lands).

Area.—64 acres, of which 7 unproductive.

Configuration and aspect.—Rugged, deeply channelled northerly slopes; ruling gradients 15° to 20°.

Elevation.—Maximum 5,700 feet, minimum 4,900 feet, mean 5,330 feet.

Soil and underlying rock.—Soil rather deeper, richer, and moister in the lower half of the compartment than that in compartment 4, which it otherwise resembles. One of the watercourses runs all the year round in the lower portion of the compartment.

Stock.—In upper ⅔ths as in compartment 4, but slightly older and with numerous bánj bushes under the chír. Mean density 0·7, quality 0·6. Below this, oak with ayár, buráns, and other broad-leaved species, especially lining the ravines. Mean density 0·4, quality 0·3. Several small blanks occur.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	19	1,425	65	2,925	482	9,640	4,640	37,120	5,206	51,110
Oaks	2	144	5	105	30	270	159	477	196	996
Miscellaneous	9	270	20	280	76	608	604	1,208	709	2,366
Total ...	30	1,839	90	3,310	588	10,518	5,403	38,805	6,111	54,472

Reproduction.—Of recent seedlings only a sprinkling in open places, but saplings and low poles of chír and bánj bushes very abundant nearly everywhere. Co-efficient of completeness, 0·6.

Accessibility.—Just below cart-road, 2½ miles from commissariat godown.

Padholi 6.

Boundaries.—North, compartment 7 and cultivation chak Bhábila khet; east, boundary of forest (Ránikhet reserve); south and west, compartment 5.

Area.—56 acres, of which 5 unproductive.

Enclosed village lands.—A single chak, Ríta khanera, area 3·2 acres.

Configuration and aspect.—Principally irregular, northerly slopes with gradients averaging 20° to 25°. A long well-marked spur runs down the whole length of the compartment in a north-westerly direction.

Soil and underlying rock.—The soil is suitable for cultivation, and indeed nearly the whole area has once been under terrace cultivation. Soil excellent for chír and bánj.

Stock.—Principally pine poles forming an upper story over a sprinkling of bánj bushes A considerable proportion of the Nepálese alder in the ravines and in the patches of deep moist soil. Many blanks occur just below the cart-road on old cultivation sites. Omitting these, mean density 0·6, quality 0·5.

Summary of valuation

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	27	2,025	58	2,610	331	6,620	2,823	22,584	3,239	33,839
Oaks	1	72	3	63	30	270	149	447	183	852
Miscellaneous ..	2	60	10	140	75	600	458	916	545	1,716
Total ..	30	2,157	71	2,813	436	7,490	3,430	23,947	3,967	36,407

Reproduction.—Owing to heavy grazing, the blanks referred to above are only slowly filling up with oak bushes and a few chír seedlings; elsewhere the grazing is light and chír saplings and low poles are very plentiful, and there is even a moderately fair show of recent seedlings. Mean co-efficient of completeness for latter area, 0·7.

Accessibility.—Just below cart-road, about 3 miles from commissariat godown.

Padholi 7.

Boundaries.—North and east, compartments 9, 8, and 12; south, boundary of forest (Ránikhet-Almora cart-road with Ránikhet reserve on the other side) and compartment 6 and chak Bhábila khet; west, boundary of forest (village lands).

Area.—68 acres, of which 6 unproductive.

Configuration and aspect.—Irregular, rugged, westerly and north-westerly slopes; ruling gradients 18° to 25°.

Elevation.—Maximum 5,700 feet, minimum 5,000 feet, mean 5,300 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—Except at the extreme upper end, which has not many years ago been under cultivation, and which is at present only dotted with a few bánj bushes and deformed chír, the stock consists chiefly of chír poles, with a mean density of 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	43	3,225	122	5,490	250	5,000	3,162	25,296	3,577	39,011
Oaks	3	216	7	147	77	693	44	132	131	1,188
Miscellaneous	1	30	6	84	23	184	239	478	269	776
Total ...	47	3,471	135	5,721	350	5,877	3,445	25,906	3,977	40,975

Reproduction.—There is a fair sprinkling of new chír seedlings in most places, but older advance growth is abundant only in patches, which, however, all but form a complete leaf-canopy.

Accessibility.—Just below cart-road, 3¼ miles from commissariat godown.

Padholi 8.

Boundaries.—North, compartment 10; east, compartment 11; south, compartment 7; west, compartment 9.

Area.—81 acres, of which 5 unproductive.

Configuration and aspect.—Northerly slopes channelled by a number of converging ravines and gullies; ruling gradients 18° to 25°.

Elevation.—Maximum 5,676 feet, minimum 4,800 feet, mean 5,200 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—Principally a very young pole forest of chír, with large trees of that species uniformly scattered throughout. About 10 acres are blanks or glades. Over most of the remainder of the area, if we include the large advance growth, the mean density is 0·7, quality 0·6

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	124	9,300	396	17,820	432	8,640	1,856	14,848	2,808	50,608
Oaks . .	2	144	1	21	3	27	22	66	28	258
Miscellaneous	...	...	...	.	40	320	193	386	233	706
Total ...	126	9,444	397	17,841	475	8,987	2,071	15,300	3,069	51,572

Reproduction.—A very fair sprinkling of recent chír seedlings in open places, as grazing is only light. Older advance growth already described.

Accessibility.—About ¾ mile below cart-road, 3¼ miles from commissariat godown.

Padholi 9.

Boundaries.—North and west, boundary of forest; east, boundary of forest and compartments 10 and 8; south, compartments 8 and 7.

Area.—83 acres, of which 7 unproductive.

Configuration and aspect.—Principally easterly or north-easterly slopes channelled by numerous mostly shallow, open ravines, with a ruling gradient of about 20°, abrupt only along the bottom.

Elevation.—Maximum 5,100 feet, minimum 4,400 feet, mean 4,700 feet.

Soil and underlying rock.—A dry sandly soil resting on mica schists, excellent for chír.

Stock.—Mostly a chír pole forest, with short and crooked trees scattered through it. Mean density 1·4, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	107	8,025	281	12,645	438	8,760	2,611	20,888	3,437	50,318
Oaks	...	..	..	...	..	...	...	...	...	..
Miscellaneous	.	...	...	...	4	32	12	24	16	56
Total ..	107	8,025	281	12,645	442	8,792	2,623	20,912	3,453	50,374

Reproduction.—Scattered saplings and low poles almost everywhere; recent reproduction very rare owing to heavy grazing.

Accessibility.—About one mile below cart-road, 3¼ miles from commissariat godown.

Padholi 10.

Boundaries.—North, boundary of forest; east, boundary of forest and compartment 11; south, compartment 8; west, compartment 9.

Area.—55 acres, of which 5 unproductive.

Configuration and aspect.—Slopes of 18° to 25° in the angle at the junction of the Melchaor and Chaukin gadheras; two-thirds of area facing north-west, remainder north-east.

Elevation.—Maximum 4,995 feet, minimum 4,400 feet, mean 4,680 feet.

Soil and underlying rock.—A little moister and deeper than in compartment 9.

Stock.—Very open inferior pure chír forest (altitude too low for bánj), the result of old cultivation and constant excessive grazing.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	267	20,025	520	23,400	561	11,220	185	1,480	1,533	56,125
Oaks	...	...	...	...	..	...	...	...	...	...
Miscellaneous	1	30	1	14	10	80	15	30	27	154
Total ...	268	20,055	521	23,414	571	11,300	200	1,510	1,560	56,279

Reproduction.—Saplings and low poles conspicuous by their almost total absence; recent reproduction rare. Co-efficient of completeness, 0 1.

Accessibility—As for compartment 9.

Padholi 11.

Boundaries.—North, boundary of forest; east and south, compartments 13 and 12; west, compartments 8 and 10.

Area.—45 acres, of which 5 unproductive.

Configuration and aspect.—Mainly easterly slopes of 30° to 35°, but dropping abruptly into the Jibrion gád. About 13 acres of easier slopes look north.

Elevation.—Maximum 5,350 feet, minimum 4,550 feet, mean 4,950 feet.

Soil and underlying rock.—As in compartment 9.

Stock.—A pure chír forest. An upper story of old and middle-aged trees surmounting numerous patches of more or less completely established and old advance growth. Mean quality of entire crop, 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	32	2,400	374	16,830	746	14,920	473	3,784	1,625	37,934
Oaks	...	...	...	...	...	.	8	24	8	24
Miscellaneous	1	30	. .	...	3	24	14	28	18	82
Total ...	33	2,430	374	16,830	749	14,944	495	3,836	1,651	38,040

Reproduction.—Co-efficient of completeness, 0·7. Older advance growth already referred to. The grazing not being heavy, there is a fair sprinkling of young seedlings.

Accessibility.—¾ mile below cart-road, 3¼ miles from commissariat godown.

Padholi 12.

Boundaries.—North, compartment 11; east, compartment 13; south, Ránikhet-Almora cart-road, with Ránikhet reserve on opposite side; west, compartments 7 and 8.

Area.—56 acres, of which 5 unproductive.

Configuration and aspect.—Principally northerly slopes of 25° to 35,° with a continuous stretch of very much steeper ground facing east.

Elevation.—Maximum 5,700 feet, minimum 4,890 feet, mean 5,200 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—Chiefly chír pole forest with a dense growth of oak, ayár, alder, káphal, and mehal in ravines and in moist places. Mean density 0 6, quality 0·5.

Summary of valuation

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood	Number of trees.	Maunds of wood.
Chír ...	24	1,800	119	5,355	439	8,780	2,396	19,168	2,978	35,103
Oaks	4	288	8	168	36	324	171	513	219	1,293
Miscellaneous	3	90	7	98	62	496	505	1,010	577	1,694
Total ..	31	2,178	134	5,621	537	9,600	3,072	20,691	3,774	38,090

Reproduction.—Saplings and low poles scattered in upper portion; elsewhere abundant A fair sprinkling of young seedlings in most places, the grazing being light Co-efficient of completeness just under road, 0·3; below, 0·6.

Accessibility.—Immediately below cart-road, 3½ miles from commissariat godown.

Padholi 13.

Boundaries.—North, compartment 11 and forest boundary; east, compartment 14; south, Ránikhet-Almora cart-road, with Ránikhet reserve on the other side and cantonment land of Upat; west, compartments 12 and 11.

Area.—102 acres, of which 9 unproductive.

Configuration and aspect.—Northerly slopes of 25° to 35,° irregular and deeply channelled near top.

Elevation.—Maximum 5,600 feet, minimum 4,550 feet, mean 5,000 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—As in compartment 12, but somewhat younger.

Summary of valuation.

Species	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV		Total.	
	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood	Number of trees.	Maunds of wood.
Chír .	12	900	113	5,085	745	14,900	3,180	25,440	4,050	46,325
Oaks .	13	936	24	504	64	576	292	876	393	2,892
Miscellaneous . .	2	60	7	98	53	424	741	1,482	803	2,064
Total	27	1,896	144	5,687	862	15,900	4,213	27,798	5,246	51,281

Reproduction.—As in compartment 12.

Accessibility.—Immediately below cart-road, about 3¾ miles from commissariat godown.

Padholi 14

Boundaries.—North, boundary of forest (village lands); east, compartment 15; south, boundary of forest (cantonment land of Upat, with a bridle-path between).

Area.—91 acres, of which 7 unproductive.

Configuration and aspect.—Northerly of north-westerly slopes of 20° to 30°.

Elevation.—Maximum 5,560 feet, minimum 4,500 feet, mean 5,050 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—Except the ravines and deeper gullies and some of the old abandoned cultivation sides which are stocked with broad-leaved species (chiefly bánj, ayár, alder, and káphal, the crop consists mainly of chír poles Mean density 0 6, quality 0 4

Summary of valuation.

Species	Girth—class I		Girth—class II.		Girth—class III		Girth—class IV		Total	
	Number of trees	Maunds of wood.	Number of trees	Maunds of wood	Number of trees.	Maunds of wood	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	53	3,975	226	10,170	361	7,220	3,836	30,688	4,476	52,053
Oaks	8	576	18	378	68	612	305	915	399	2,481
Miscellaneous ...	...		4	56	46	368	708	1,416	758	1,840
Total	61	4,551	248	10,604	475	8,200	4,849	33,019	5,633	56,374

Reproduction.—Co-efficient of completeness, 0 2.

Accessibility.—Immediately below cart-road, about 4 miles from commissariat godown.

Padholi 15.

Boundaries.—North and east, boundary of forest (villages lands); south, boundary forest cantonment land of Upat, with bridle-road between); west, compartment 14

Area.—87 acres, of which 7 unproductive.

Configuration and aspect.—Irregular north-easterly and north-westerly slopes of very variable gradients (12° to 50°) and channelled by numerous ravines and gullies

Elevation.—Maximum 5,600 feet, minimum 5,000 feet, mean 5,300 feet.

Soil and underlying rock.—As in compartment 2.

Stock.—Mainly a pole forest of pure chír, except along the deeper gullies, where oak, ayár, and mehal enter into mixture. Mean density 0 6, quality 0 7.

Summary of valuation.

Species.	Girth—class I		Girth—class II.		Girth—class III		Girth—class IV		Total	
	Number of trees	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees	Maunds of wood	Number of trees	Maunds of wood	Number of trees	Maunds of wood
Chír	77	5,775	293	13,185	410	8,200	3,130	25,040	3,910	52,200
Oaks	2	144	12	252	44	396	129	387	187	1,179
Miscellaneous	...	...	4	56	38	304	343	686	385	1,046
Total	79	5,919	309	13,493	492	8,900	3,602	26,113	3,482	54,425

Reproduction.—Co-efficient of completeness, 0 6. Recent seedlings very few, but saplings and small poles of chír very numerous.

Accessibility.—Just below cart-road, 4½ miles from commissariat godown.

CHAPTER VIII.—THE DWÁRSAON FOREST.

Situation and boundaries.—This forest lies between parallels 29°-38′-47″ and 29°-40′-30″ north latitude and 79°-31′-34″ and 79°-34′-54″ east longitude. By far the greater portion of the area is situated in patti Rúni of pargana Bára Mandal, only two small portions extending respectively into pattis Malla Tikhun and Dwársaon of the same pargana. Its boundary at the south-west corner marches for about ⅓ths of a mile with that of the Ránikhet reserve; everywhere else it is conterminous with village lands.

Area.—1,514 acres, of which 113 unproductive.

Number of compartments.—15.

Topography.—The ground is of extremely irregular conformation, comprising as it does the headwaters (i) of two important affluents of the Ulábhága river (the Jaorási nála and another gadhera), which flow south, (ii) of the Dewarghát gadhera, which flows east, and (iii) of a feeder of the Gaggás river flowing north-west. The most extensive of these basins is that of the Jaorási nála, which, after collecting the waters of numerous feeders ramifying in every direction, issues southwards through a narrow gorge between two high cross ridges. Thus there are numerous long inner valleys and deep glens, most of them protected on the south by the two high ridges just referred, although the main part of the drainage runs out southwards. Obviously, therefore, aspects are continually changing, but northerly exposures predominate. The ruling gradients vary between 25° and 35°.

Elevation.—Maximum 6,518 feet, minimum 5,500 feet, mean 5,950 feet.

Soil and underlying rock.—The hills are composed mainly of the usual mica schists, which yield a fine-grained free soil that is very poor without a growth of broad-leaved species overhead. Strings and pockets of an impure graphite crop out of the foot of a spur opposite Manj Kháli, and the ordinary shale occurs at a few points; but neither of these rocks has any general modifying influences on the soil, which, although generally shallow and stony, is, nevertheless, everywhere excellent for chír and bánj.

Stock.—The results of the enumeration survey of the

Species.	Diameter class.	Compartment 1, area 103 acres.		Compartment 2, area 48 acres.		Compartment 3, area 35 acres.		Compartment 4, area 117 acres.		Compartment 5, area 182 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	33	·32	8	·16	4	·11	47	·40	145	·79
	II.	91	·88	33	·68	42	1·20	119	1·01	280	1·53
	III.	451	4·37	103	2·14	72	2·05	135	1·15	549	3·01
	IV.	5,470	53·10	2,501	52·10	1,833	52·37	8,418	71·94	4,958	27·24
Total .	...	6,045	58·68	2,645	55·10	1,951	55·74	8,719	74·52	5,932	32·59
Phanáth	I.	...	...	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	...	...	...
	III.	...	...	...	...	...	...	...	...	...	.
	IV.	...	...	...	...	...	..	...	...	...	...
Total ...	...	...	...	...	...	...	...	...	...	...	...
Bánj	I.	...	...	2	·04	2	·05	9	·07	155	·85
	II.	...	...	19	·39	2	·05	13	·11	185	1·01
	III.	8	·07	54	1·12	22	·62	118	1·01	763	4·19
	IV.	7	·06	204	4·25	73	2·08	298	2 54	2,499	13·73
Total ...	...	15	·14	279	5·81	99	2·82	438	3·74	3,602	19·73
Ayar	I.	...	...	...	...	...	...	1	·01	...	...
	II.	1	·01	1	·02	...	...	5	·04	3	·01
	III.	4	·03	10	·20	4	·11	57	·48	47	·25
	IV.	28	·27	58	1·20	43	1·22	338	2·88	569	3·12
Total ...	...	33	·32	69	1·43	47	1·34	401	3·42	619	3·40
Burána	I.	...	...	...	...	...	...	...	...	11	·06
	II.	1	·01	1	·02	1	·02	...	...	52	·28
	III.	2	·01	3	·06	...	...	28	·23	226	1·24
	IV.	3	·02	4	·08	2	·05	107	·91	751	4·12
Total ...	...	6	·05	8	·16	3	·08	135	1·15	1,040	5·71
Miscellaneous species ...	I.	...	...	...	...	...	...	...	...	1	·01
	II.	...	...	1	·02	1	·02	1	·01	9	·04
	III.	7	·06	...	...	11	·31	28	·23	105	·57
	IV.	76	·73	39	·81	31	·88	291	2·48	672	3·69
Total ...	...	83	·80	40	·83	43	1·22	320	2·73	787	4 32
Average ...	...	6,182	60·01	3,041	63·35	2,143	61·22	10,013	85·58	11,980	65·82

trees made are summarized in the following abstract :—

Compartment 6, area 126 acres.		Compartment 7, area 136 acres.		Compartment 8, area 178 acres.		Compartment 9, area 82 acres		Compartment 10, area 94 acres.		Compartment 11, area 85 acres.		Compartment 12, area 124 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
35	·27	48	·35	49	·27	16	·19	6	·06	5	·05	26	.20
111	·88	179	1·31	222	1·24	72	·87	42	·44	2	·02	203	1·63
195	1·54	310	2·28	412	2·31	85	1·03	59	·62	16	·18	293	2 36
3,072	24·38	2,353	17·30	1,718	9·65	1,409	17·18	427	4 54	611	7·30	1,576	12·70
3,413	27·08	2,890	21·25	2,401	13·48	1,582	19·29	534	5·69	634	7·57	2,098	16·91
...	...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	..	...	...	...
...	...	2	·01	...	...	...	...	...	...	3	·03	1	·01
...	...	3	·02	...	...	...	...	...	...	1	·01	5	04
...	...	5	·03	...	...	...	...	...	...	4	·04	6	·04
84	·66	304	2·22	111	·62	72	·87	53	·56	3	·03	55	·44
127	1·01	443	3·25	150	·84	70	·85	65	·69	15	.17	145	1·16
362	2·87	1,095	8·03	558	3·15	140	1·71	205	2·18	60	·70	411	3·31
1,388	11·01	1,980	14·55	1,630	9·15	951	11·59	1,029	10·94	408	4·80	1,940	15·64
1,961	15·56	3,822	28·10	2,449	13·75	1,233	15·03	1,352	14·48	486	5·71	2 551	20·57
...	...	1	·01	...	...	1	·01	2	·02	...	...	...	...
.	...	21	·15	1	·01	5	·06	...	..	...	...	6	·04
12	·09	63	·46	16	·08	28	·34	19	·20	4	·04	36	·29
78	·61	506	3·72	162	·91	106	1·29	148	1·57	10	·11	117	·94
90	·71	591	4·19	179	1·01	140	1·71	169	1·79	14	·16	159	1·28
1	·01	78	·57	...	...	9	·11	12	·12	...	...	5	·04
7	·05	199	1·45	9	·05	35	·42	41	·43	...	...	4	·03
25	·19	461	3 38	32	·17	104	1·26	185	1·96	2	·02	12	·09
56	·44	1,067	7·84	52	·29	356	4 34	514	5·46	21	·24	62	·50
89	·70	1,805	13·27	93	·52	504	6·26	752	8·00	23	·27	83	·66
1	·01	1	·01	4	·02	1	·01	3	·03	1	·01	7	·05
7	·05	9	·06	3	·01	10	·12	3	·03	...	...	7	·05
75	·59	67	·49	24	·13	47	·57	45	·47	8	·09	46	·37
434	3·44	390	2·86	173	·97	239	2 91	135	1·43	112	1·31	424	3 41
517	4·11	467	3·43	204	1·14	297	3·62	186	1·97	121	1·42	484	3 90
6,070	48·01	9,580	70·44	5,326	29 92	3,756	45 81	2,993	31·84	1,282	15·08	5,381	43·39

Species.	Diameter class.	Compartment 13, area 74 acres.		Compartment 14, area 61 acres.		Compartment 15, area 69 acres.		Entire forest, area 1,514 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	15	·20	...	...	...	...	437	·28
	II.	33	·44	...	...	...	...	1,429	·94
	III.	70	·94	...	...	...	...	2,750	1·81
	IV.	1,218	16·45	...	...	...	...	35,564	23·49
Total ...	...	1,336	18·08	...	...	...	...	40,180	26·53
Phanáth	I.	...	...	...	...	...	...	...	...
	II.	...	...	...	...	...	...	...	..
	III.	...	...	...	...	...	...	6	·01
	IV.	...	...	...	...	...	...	9	·01
Total ...	...	...	...	...	...	...	...	15	·01
Ránj	I.	83	1·12	...	...	...	...	933	·61
	II.	140	1·89	...	...	...	...	1,374	·90
	III.	352	4·75	...	...	...	...	4,148	2·73
	IV.	518	7·00	...	...	...	...	12,925	8 53
Total ...	...	1,093	14·77	...	...	...	...	19,380	12·80
Ayár	I.	...	...	...	...	...	...	5	·01
	II.	2	·02	...	...	...	...	45	·02
	III.	27	·36	...	...	...	...	327	·21
	IV.	143	1·93	...	...	...	...	2,306	1·52
Total ...	...	172	2·32	...	...	...	...	2,683	1·77
Buráns	I.	5	·06	...	...	...	...	121	·07
	II.	19	·25	...	...	...	...	369	·24
	III.	59	·79	...	...	...	...	1,139	·75
	IV.	112	1·51	...	...	...	...	3,107	2·05
Total ...	...	195	2·63	...	...	...	...	4,736	3·12
Miscellaneous	I.	1	·01	...	...	...	...	20	·01
	II.	4	·05	...	...	...	...	55	·03
	III.	11	·14	...	...	...	...	474	·31
	IV.	158	2·13	...	...	...	...	3,174	2·09
Total ...	...	174	2·35	..	...	...	...	3,723	2·45
Average ...	...	2,970	40·18	..	...	...	...	70,717	46·70

The easterly slopes at the eastern extremity of the tract bear principally young pole forest of pure chír, and the northerly slopes running down to its northern edge and the deeper glens in the interior are covered mainly with degraded bánj coppice, pure or mixed with buráns and with other species; while elsewhere, as the aspect changes with the sweep of the slopes, pure chír forest merges into mixed chír and bánj, and that in its turn into exclusively broad-leaved forest composed chiefly of bánj and buráns. Many of the slopes have been under cultivation, some of them only very recently, and consequently numerous blanks and glades occur.

Reproduction is in many places well advanced, but constant heavy grazing and repeated severe lopping of the banj and other broad-leaved saplings, poles and trees renders its condition, on the whole, unsatisfactory.

There is a good future for this forest, but complete recovery within a reasonable period is not possible without some system of closing by rotation.

Fire conservancy.—Not undertaken hitherto.

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names:—

Name of patti.	Names of villages having rights.	Description of rights.																		
		Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stone for building.	Slate.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghats.	Limestone.	Bamboos and bábar.
Walla Athaguli.	Gudholi	...	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Dugowra	...	...	...	...	...	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
Reoni ...	Banolya	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Digoti	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Naini	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Reonigáon	R	R	R	R	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
	Batulya	R	R	R	R	...	...	...	...	...	R	...	...	...	R	...	...	...	...	...	...
	Sungarkhal	R	R	R	R	R	...	R	...	...	R	...	...	...	R	...	...	...	...	...	...
	Dangalya	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Ginah	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
Dwársaon ...	Dinda Malla	R	R	R	R	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	With its hamlets ...	R	R	R	R	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Turkora	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Kharkhet	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Manbajon	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Wurali	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Baburkhola	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Tushyari	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Bhainsoli	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Batulya	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Sunoli	R	R	R	...	R	...	R	...	R	...	...	...	...	R	...	...	...	...	...	...
Malla Tikhun	Dangikhola	...	R	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Kuiralsi	R	R	R	R	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
	Khowri	R	R	R	...	R	...	R	...	...	...	...	...	...	R	...	...	...	...	...	...
Kaligarh ...	Dhankoli	R	R	R	...	R	...	R	...	...	...	R	...	...	...	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows :—

Number.	Name of patti.	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats	Total.
	Malla Tikhun ..	Quirala ...	242	24	...	66	332
		Louri	132	...	...	46	178
	Reoni ...	Banolia ...	126	...	...	70	196
		Digori	330	8	...	82	420
		Naini	150	...	...	112	262
		Reonigáon ...	786	70	...	404	1,260
		Batulia ...	96	...	...	88	184
		Sungar Khal ...	168	10	...	132	310
		Dungalya ..	298	2	...	256	556
		Ginai	154	2	...	8	164
	Dwársaon ...	Dinda with its lagga,	322	26	...	246	594
		Turkaude ...	54	...	...	44	98
		Kharkhet ...	126	...	...	72	198
		Mambajown ...	194	...	...	60	254
		Oarali .	206	.	...	138	344
		Rabur Khola ...	344	...	...	188	532
		Tusyari ...	92	8	...	78	178
		Bhainsoli ...	192	...	..	66	258
		Batulia ...	22	...	...	20	42
		Simoli ...	186	...	...	130	316
		Do. lagga ...	228	...	...	284	512
		Total .	4,448	150	..	2,590	7,188
		Average number per acre.	2·9	0·1	...	1·7	4·8

As regards trees, the numbers the villagers have actually received on requisition during the past five years are shown in the subjoined statement :—

Forest.	Year	Chir. Trees.	Chir. Poles	Oak. Trees.	Oak. Poles	Miscellaneous. Trees.	Miscellaneous. Poles.	Total. Trees	Total. Poles.	Grand Total
Dwársaon	1881-82	12	88	...	74	..	1	12	163	175
	1882-83	29	229	..	46	...	...	29	275	304
	1883-84	13	184	...	...	...	...	13	184	197
	1884-85	15	73	...	87	..	...	15	160	175
	1885-86	42	387	..	...	...	...	42	387	429
Total for 5 years ...	..	111	961	...	207	.	1	111	1,169	1,280
Average per annum ...	...	22	192	...	41	...	1	22	234	256

From 1871-72, when the forest first came under departmental control, to 1880-81 they were given chír dundárs and bansás as follows :—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundárs	200	73	35	103	...	136	1,267	60	64	132	2,070
Bansas	67	44	22	104	11	112	14	136	30	132	672

Dwársaon 1.

Boundaries—North, compartment 3 ; east and south, boundary of forest ; west, boundary of forest and compartment 2.

Area.—103 acres, of which 7 unproductive.

Configuration and aspect.—The compartment stretches across several spurs, two of them long and well marked and running down respectively east and south-east. The aspects are therefore very variable, but easterly exposures predominate. Ruling gradients 25° to 30°. A few scarps occur.

Elevation.—Maximum 6,106 feet, minimum 5,600 feet, mean 5,900 feet.

Soil and underlying rock.—Soil very variable, but generally of a medium nature, resting on micaceous schistose sandstone, fragments of which are mixed with or cover the soil. Excellent soil for mixed chír and bánj.

Stock.—Mainly pure chír pole forest. About ¼th of the aggregate area is very open; over the rest the mean density is about 0·7, quality 0·5

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	33	2,475	91	4,095	451	9,020	5,470	43,760	6,045	59,350
Oaks	...	...	...	...	8	72	7	21	15	93
Miscellaneous	...	...	2	28	13	104	107	214	122	346
Total ...	33	2,475	93	4,123	472	9,196	5,584	43,995	6,182	59,789

Reproduction.—Saplings and young poles of chír are abundant, and there is a fair sprinkling of recent seedlings in spite of the heavy grazing. Co-efficient of completeness, 0 6.

Accessibility.—About 1½ miles of coolie carriage to a point on the cart-road 12½ miles from commissariat godown.

Dwársaon 2.

Boundaries.—North, south, and west, boundary of forest; east, compartment 1.

Area.—48 acres, of which 4 unproductive.

Configuration and aspect.—Fairly uniform westerly slopes with gradients averaging 35°.

Elevation.—Maximum 6,106 feet, minimum 5,750 feet, mean 5,950 feet.

Soil and underlying rock—Soil stonier and drier than in compartment 1; excellent for chír in mixture with bánj.

Stock.—As in compartment 1, but slightly more open, and with an appreciable amount of oak, owing to favourable aspect.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	8	600	33	1,485	103	2,060	2,501	20,008	2,645	24,153
Oaks	2	144	19	399	54	486	204	612	279	1,641
Miscellaneous	...	...	3	42	13	104	101	202	117	348
Total ...	10	744	55	1,926	170	2,650	2,806	20,822	3,041	26,142

Reproduction.—As in compartment 1.

Accessibility.—About 2½ miles of coolie carriage to a point about 12 miles from commissariat godown.

Dwarsaon 3.

Boundaries.—North, compartment 4; east, boundary of forest; south, boundary of forest and compartment 1; west, compartment 2 and boundary of forest.

Area.—35 acres, of which 4 unproductive.

Configuration and aspect.—Sheltered easterly and southerly slopes forming the head of the Anaoli gád basin. Ruling gradient 35°.

Elevation.—Maximum 6,200 feet, minimum 5,900 feet, mean 6,020 feet.

Soil and underlying rock.—As in compartment 1, but perhaps slightly moister.

Stock.—As in compartment 1, but with more oak and other broad-leaved trees, owing to the more sheltered locality.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	4	300	42	1,890	72	1,440	1,833	14,664	1,951	18,294
Oaks	2	144	2	42	22	198	73	219	99	603
Miscellaneous	...	...	2	28	15	120	76	152	93	300
Total ...	6	444	46	1,960	109	1,758	1,982	15,035	2,143	19,197

Reproduction.—As in compartment 1.

Accessibility.—About ¾ mile less coolie carriage than from compartment 2.

Dwarsaon 4.

Boundaries.—North, compartment 5; east and west, boundary of forest; south, boundary of forest and compartment 3.

Area.—187 acres, of which 6 unproductive.

Configuration and aspect.—Principally the upper portion of the basin of the Kaligád. The slopes forming the right-hand side of the basin (more than ⅔rds of the area) look north, while the remainder have a southerly or south-easterly aspect. Gradients very variable, ruling 25° to 35°.

Elevation.—Maximum 6,255 feet, minimum 5,535 feet, mean 5,850 feet.

Soil and underlying rock.—Soil shallow and stony, excellent for chír. The usual sandstone underlies the soil everywhere, except near the bottom, where soft impure graphite crops out.

Stock.—Excluding the deeper glens and ravines, where oaks and other broad-leaved trees are abundant, the stock is a young pole forest of chír. Mean density 0·7, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	47	3,525	119	5,355	135	2,700	8,418	67,344	8,719	78,924
Oaks	9	648	13	273	118	1,062	298	894	438	2,877
Miscellaneous	1	30	6	84	113	904	736	1,472	856	2,490
Total ...	57	4,203	138	5,712	366	4,666	9,452	69,710	10,013	84,291

Reproduction.—Saplings and low poles of chír and low coppice of the broad-leaved species are abundant in their special situations. New seedlings are not numerous. Mean co-efficient of completeness, 0 6.

Accessibility.—On cart-road just under 12 miles from the commissariat godown.

Dwársaon 5.

Boundaries.—North, compartment 6 and boundary of forest; east, boundary of forest; south, compartment 4 and outer boundary of forest; west, compartment 5.

Area.—182 acres, of which 15 unproductive.

Configuration and aspect.—Principally northerly slopes with rounded contours forming the right-hand side of the basin of the Chourikhál rauli. Ruling gradients 28° to 35°.

Elevation.—Maximum 6,518 feet, minimum 5,620 feet, mean 6,100 feet.

Soil and underlying rock.—Soil shallow and stony, but still excellent for mixed chír and bánj.

Stock.—On slopes exposed directly to the north the crop is principally oak with other broad-leaved species; mean density 0·7. Elsewhere chír predominates and is often pure; mean density 0·5; quality 0 6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	145	10,875	280	12,600	549	10,980	4,958	39,664	5,932	74,119
Oaks	155	11,160	185	3,885	763	6,867	2,499	7,497	3,602	29,409
Miscelaneous	12	360	64	896	378	3,024	1,992	3,984	2,446	8,264
Total ...	312	22,395	529	17,381	1,690	20,871	9,449	51,145	11,980	111,792

Reproduction.—As in compartment 4.

Accessibility.—On cart-road, 11 miles from commissariat godown.

Dwársaon 6.

Boundaries.—North and east, boundary of forest; south, compartment 5; west, compartment 7.

Area.—126 acres, of which 10 unproductive.

Configuration and aspect.—The compartment occupies both sides of a spur running down from west to east. The slopes on the southern flank are irregular, rugged, and generally steep, and form the left side of the basin of the Chaurikhál

rauli. The northern flank consists of a succession of narrow gullies and small rounded spurs, with gradients varying on an average between 20° and 30°.

Elevation.—Maximum 6,255 feet, minimum 5,620 feet, mean 5,800 feet.

Soil and underlying rock.—As in compartment 5.

Stock.—The northern slopes bear chiefly a young coppice of broad-leaved species of density 0·5, while on the southern flank there is an open forest of chír poles, density 0·3, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	35	2,625	111	4,995	195	3,900	3,072	24,576	3,413	36,096
Oaks	84	6,048	127	2,667	362	3,258	1,388	4,164	1,961	16,137
Miscellaneous	2	60	14	196	112	896	568	1,136	696	2,288
Total ...	121	8,733	252	7,858	669	8,054	5,028	29,876	6,070	54,521

Reproduction.—Mean co-efficient of completeness, 0·5; higher in the upper portion. Mainly low coppice of broad-leaved species or chír saplings and low poles according to aspect.

Accessibility.—On cart-road, 10½ miles from commissariat godown.

Dwarsaon 7

Boundaries.—North, boundary of forest; east, compartments 6 and 5; south, compartment 8; west, compartment 11.

Area.—136 acres, of which 8 unproductive.

Configuration and aspect.—The compartment comprises the entire basin of one, and half that of another, feeder of the Jaorási nala. Both streams run from east to west, and the slopes that run up from them are generally steep (from 25° to 40°) and are so irregular as to present various aspects, although northerly exposures predominate.

Elevation.—Maximum 6,518 feet, minimum 5,850 feet, mean 6,100 feet.

Soil and underlying rock.—As in compartment 5.

Stock.—Owing to predominant northern aspects, forest of oak and other broad-leaved species is most largely represented: average density of entire stock 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	48	3,600	179	8,055	310	6,200	2,353	18,824	2,890	36,679
Oaks	304	21,888	443	9,303	1,097	9,873	1,983	5,949	3,827	47,013
Miscellaneous	80	2,400	229	3,206	591	4,728	1,963	3,926	2,863	14,260
Total ...	432	27,888	851	20,564	1,998	20,801	6,299	28,699	9,580	97,952

Reproduction.—Mean co-efficient of completeness, 0·7. Mainly saplings and low poles and coppice.

Accessibility.—One mile of coolie carriage to a point on the cart-road less than 10 miles from commissariat godown.

Dwársaon 8.

Boundaries.—North, compartment 7; east and south, boundary of forest; west, boundary of forest and compartment 9.

Area.—178 acres, of which 15 unproductive.

Configuration and aspect.—Most irregular configuration. All aspects are represented, but southerly, south-easterly, and south-westerly exposures predominate. Ruling gradients 28° to 35°.

Elevation.—Maximum 6,518 feet, minimum 5,500 feet, mean 5,900 feet.

Soil and underlying rock.—As in compartment 5.

Soil.—Area about equally distributed between chír and broad-leaved forest. The chír crop is chiefly in the pole stage and has an average density of 0·5. The broad-leaved crop is also young, but is slightly more dense and bánj easily preponderates in it. Quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	49	3,675	222	9,990	412	8,240	1,718	13,744	2,401	35,649
Oaks	111	7,992	150	3,150	558	5,022	1,630	4,890	2,449	21,054
Miscellaneous	4	120	13	182	72	576	887	774	476	1,652
Total ...	164	11,787	385	13,322	1,042	13,838	3,735	19,408	5,326	58,355

Reproduction.—Mean co-efficient of completeness, 0·6 in broad-leaved, 0·4 in chír forest. In the latter the majority of seedlings quite established.

Accessibility.—Two miles of difficult coolie carriage to cart-road; thence just under 10 miles to Ránikhet.

Dwársaon 9.

Boundaries.—North and west, compartment 14; east, compartment 8; south, boundary of forest.

Area.—82 acres, of which 6 unproductive.

Configuration and aspect.—Mainly the basin of the Káphalkhet nála, which runs from south-west to north-east. The right side of the basin has a northern and the left side a general south-eastern exposure. Ruling gradients 25° to 35°.

Elevation.—Maximum 6,300 feet, minimum 5,650 feet, mean 5,900 feet.

Soil and underlying rock.—As in compartment 5.

Stock.—On the northern slopes and at the bottom of the compartment a very good forest of mixed oak and chír with inferior broad-leaved trees; elsewhere a promising young crop of chír. Mean density, including small poles, 0·6, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	16	1,200	72	3,240	85	1,700	1,409	11,272	1,582	17,412
Oaks	72	5,184	70	1,470	140	1,260	951	2,853	1,233	10,767
Miscellaneous	11	330	50	700	179	1,432	701	1,402	941	3,864
Total ..	99	6,714	192	5,410	404	4,392	3,061	15,527	3,756	32,043

Reproduction.—Mean co-efficient of completeness, 0·6. Mainly saplings and low poles and coppice shoots.

Accessibility.—Just below a good bridle-road; 2 miles of this road and then 4½ miles by cart-road.

Dwársaon 10.

Boundaries.—North, compartments 12 and 11; east and south, compartment 7, boundary of forest; west, compartment 14.

Area.—94 acres, of which 7 unproductive.

Configuration and aspect.—Irregular northerly slopes forming the right side of basin of Khanairi nála, which runs from west to east. Ruling gradients 20° to 35°.

Elevation.—Maximum 6,362 feet, minimum 5,675 feet, mean 6,100 feet.

Soil and underlying rock.—As in compartment 5.

Stock.—A promising, generally very young, mixed crop of bánj, chír, buráns, and ayár, with plenty of brushwood. Mean density, inclusive of low poles and large coppice shoots, 0·5, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	6	450	42	1,890	59	1,180	427	3,416	534	6,936
Oaks ...	53	3,816	65	1,365	205	1,845	1,029	3,087	1,352	10,113
Miscellaneous	17	510	44	616	249	1,992	797	1,594	1,107	4,712
Total ...	76	4,776	151	3,871	513	5,017	2,253	8,097	2,993	21,761

Reproduction.—As in compartment 9.

Accessibility.—Same as compartment 9.

Dwársaon 11.

Boundaries.—North, boundary of forest; east, compartment 7; south, compartment 10; west, compartment 12.

Area.—85 acres, of which 7 unproductive.

Configuration and aspect.—The compartment sits across the Rewa Dhár, which runs down south-east between the Jaorási and Khanairi nálas. The slopes on the left flank, drained into the former nála, look south-east and east, while those on the

other flank, overhanging directly the second nála, look south-west. Ruling gradients 25° to 30°.

Elevation.—Maximum 6,128 feet, minimum 5,675 feet, mean 5,900 feet.

Soil and underlying rock.—Soil shallower and more stony than that in compartment 12, but nevertheless excellent for mixed oak and chír.

Stock.—On the south-westerly slopes similar to that in compartment 12, but with a large proportion of chír mixed with the oak; on the other flank of the spur principally degraded broad-leaved forest, density 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	5	375	2	90	16	320	611	4,888	634	5,673
Oaks	3	216	15	315	63	567	409	1,227	490	2,325
Miscellaneous	1	30	...	...	14	112	143	286	158	428
Total ...	9	621	17	405	93	999	1,163	6,401	1,282	8,426

Reproduction.—Oak coppice bushes are fairly abundant; reproduction of chír very backward. Co-efficient of completeness, 0·4

Accessibility.—About a mile of coolie carriage to cart-road, whence 7 miles to commissariat godown.

Dwársaon 12.

Boundaries.—North, boundary of forest; east, compartment 11; south, compartment 10; west, boundary of forest and compartment 13.

Area.—124 acres, of which 8 unproductive.

Configuration and aspect.—The upper left half of the Khanairi nála basin. Irregular, mainly south-easterly slopes, with several deep glens. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,310 feet, minimum 5,820 feet, mean 6,000 feet.

Soil and underlying rock.—Second class cultivable soil nearly everywhere; excellent for mixed chír and banj.

Stock.—About three-fourths of the area have recently been under cultivation: hence, except on the crests of the more prominent spurs, where there is nearly pure chír forest of mean density 0·4 and quality 0·2, the crop consists principally of sparse degraded bánj coppice, kept down by constant heavy grazing and lopping.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood
Chír .. .	26	1,950	203	9,135	293	5,860	1,576	12,608	2,098	29,553
Oaks ...	55	3,060	145	3,015	412	3,708	1,945	5,835	2,557	16,548
Miscellaneous	12	360	17	238	94	752	603	1,206	726	2,556
Total ...	93	6,270	365	12,418	799	10,320	4,124	19,649	5,381	48,657

Reproduction.—Of chír very backward; of bánj in a low bushy state. Mean co-efficient of completeness only 0·2, due to heavy grazing.

Accessibility.—Half a mile from cart-road, whence 6½ miles from commissariat godown.

Dwársaon 13.

Boundaries.—North and west, boundary of forest; east and south, compartment 12.

Area.—74 acres, of which 6 unproductive.

Configuration and aspect.—Head of basin of the Jamír gadhera, which runs from east to west. The slopes are sheltered on the south by the Khubkonia dhár and sweep round from east to south, and thence to west, thus producing southerly, westerly, and northerly aspects. Ruling gradients 18° to 25°.

Elevation.—Maximum 6,200 feet, minimum 5,290 feet, mean 6,080 feet.

Soil and underlying rock.—Soil shallower than and inferior to that in compartment 11, but still excellent for mixed chír and bánj.

Stock.—Chiefly a young forest of mixed chír and bánj, with inferior broad-leaved species. Mean density 0 5, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	15	1,125	33	1,485	70	1,400	1,218	9,744	1,336	13,754
Oaks	83	5,976	140	2,940	532	3,168	518	1,554	1,093	13,638
Miscellaneous	6	180	25	350	97	776	413	826	541	2,132
Total .	104	7,281	198	4,775	699	5,344	2,149	12,124	2,970	29,524

Reproduction.—As in compartment 12.

Accessibility.—On cart-road, about 6 miles from commissariat godown.

Dwársaon 14.

Boundaries.—North, boundary of forest (village lands); east, compartment 10, south, boundary of forest (Ránikhet reserve); west, compartment 15.

Area.—61 acres, of which 5 unproductive.

Configuration and aspect.—Irregular easterly, northerly, and north-westerly slopes sheltered on the south by the great Gosikáne dhár, forming the major portion of the head of the Kaligád basin. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,310 feet minimum 5,800 feet, mean 6,100 feet.

Soil and underlying rock.—As in compartment 13.

Stock.—Resembles that in compartment 10, but contains more blanks. Some points are well stocked with chír, others with bánj and brons, but are suffering from severe lopping. Mean density 0·4, quality 0 4.

No valuation made owing to poverty and low age of crop.

Reproduction.—Not so good as in compartment 9.

Accessibility.—On cart-road, 5½ miles from commissariat godown.

Dwársaon 15.

Boundaries.—North and west, boundary of forest (village lands); east, compartment 14; south, boundary of forest (Ránikhet reserve).

Area.—69 acres, of which 5 unproductive.

Configuration and aspect.—With the exception of about 12 acres, the compartment sits across a flat-topped spur which runs out slightly east of north. More than half the area looks north-west, the remainder north and north-east. Ruling gradients 15° to 25°.

Elevation.—Maximum 6,193 feet, minimum 5,762 feet, mean 5,880 feet.

Soil and underlying rock.—As in compartment 13.

Stock.—Mainly bánj, buráns, and ayár coppice, interspersed with several blanks. There is also some mixed chír on convex contours with an easterly exposure.

No valuation made for the same reason as for compartment 14.

Reproduction.—Principally degraded coppice of bánj and buráns. Co-efficient of completeness, 0·3.

Accessibility.—The compartment extends for ¾ mile along cart-road, 5 miles from commissariát godown.

CHAPTER IX.—THE CHAUBATTIA FOREST, EAST.

Situation and boundaries.—This forest extends between 29°-35′-29″ and 29°-39′-20″ north latitude and 79°-30′-18″ and 79°-31′-59″ east longitude. It is situated almost entirely in patti Kundurkhuwa of pargana Phaldákot, only a narrow long belt along its south-western boundary lying in patti Chaugáon of the same pargana. At its northern extremity it touches the Ránikhet reserve, and from thence south-westward for 2¼ miles its boundary marches with that of the cantonment. All the remaining boundaries are village lands.

Area.—875 acres, of which 80 unproductive.

Enclosed village lands.—There are 23 enclosed chaks, aggregating 60 acres, distributed into 21 separate plots, as follows:—

		Acres.
1.	Chalina	1·0
2.	Bhukrakhets, Malla and Talla	8·0
3.	Thára Shim	1·1
4.	Chura Sela	1·2
5.	Bhána Ijar	3·6
6.	Bajardeo (I)	1·9
7.	„ (II) and Payán Ijar	8·4
8.	Ureni	0·8
9.	Lunia Kháta	2·0
10.	Warkhet Malla	0·8
11.	Orkhet	1·2
12.	Orkhet Talla	0·7
13.	Kímu Ijar (I)	1·0
14.	„ „ (II)	2·6
15.	„ „ (III)	2·2
16.	Gunbar Ijar	3·2
17.	Kathpatia	8·1
18.	Chulási	0·8
19.	Timilkholi	2·1
20.	Dolkhet	8·1
21.	Gáontheli	1·2
		60·0

Number of compartments.—13.

Topography.—Most of the area lies across a great spur which is an offshoot, in a south-easterly direction, of the ridge on which the Chaubattia cantonment is built.

The slopes forming the right flank of the spur, and comprising more than half the area, are all south-westerly or southerly, and directly overhang or are at least drained into the Bagri nála. The left flank comprises principally easterly and north-easterly slopes. The conformation of the ground is very irregular owing to numerous minor spurs and ravines and gullies, so that the gradients are very variable; but, as a rule, they range between 20° to 35°.

Elevation.—Maximum 6,814 feet, minimum 5,100 feet, mean 6,350 feet.

Soil and underlying rock.—The soil is dry, sandy, of very variable depth and richness, in many places fit for field cultivation, and resting mainly on schistose gneiss in the south-western half, and on that rock and a hard grey quartzose sandstone and granite in the other; excellent soil for mixed chír and bánj.

Stock.—The following is a summary of the results of the enumeration survey :—

Species.	Diameter class.	Compartment 1, area 36 acres		Compartment 2, area 115 acres.		Compartment 3, area 73 acres.		Compartment 4, area 36 acres.		Compartment 5, area 97 acres	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees	Number of trees per acre
Chír	I.	...	...	31	·26	3	·03	...	...	52	53
	II.	...	...	196	1·70	28	·38	10	·27	306	3 15
	III	...	...	864	7·51	113	1 54	152	4·22	967	9 96
	IV.	80	2 22	2,163	18 80	497	6·80	245	6·80	2,227	22 89
Total ...	...	80	2 22	3,254	28 29	641	8 78	407	11 30	3,552	36 61
Bánj	I	29	·80	82	·71	181	2·47	88	2 44	39	40
	II.	115	3·19	231	2·	265	3·63	172	4·77	113	1 16
	III.	233	6·47	1,069	9·29	726	9 94	494	13 72	551	5 68
	IV.	2,288	63 55	2,120	18 43	1,653	22 64	1,349	37·47	1,188	12 24
Total ...	...	2,665	74·02	3,502	30 45	2,825	38 69	2,103	58 41	1,891	19 49
Ayár	I	...	..	...	...	...	...	1	·02	...	...
	II.	1	·02	8	·06	4	·05	3	08	5	·05
	III	79	2 19	44	·38	43	·58	33	·91	37	38
	IV	142	3 94	633	5 50	354	4 84	282	7 83	197	2·03
Total ...	...	222	6·16	685	5·95	401	5 49	319	8 85	239	2 46
Burán	I	...	...	7	·06	34	·46	10	·27	...	.
	II	...	...	35	·30	84	1 15	32	·88	10	·10
	III.	64	1·77	119	1·03	350	4 79	185	5·13	42	·43
	IV	187	5·19	478	4 15	900	12·32	724	20·11	123	1 26
Total ...	...	251	6 97	639	5 55	1,368	18 73	951	26·41	175	1 80
Miscellaneous ...	I.	...	..	8	06	8	·10	15	·41	6	06
	II.	5	·13	5	04	10	·13	12	·33	14	·14
	III	30	·83	43	·37	122	1 67	73	2 02	47	48
	IV.	325	9 02	592	5 14	582	7 97	380	10 55	100	1 03
Total ...	...	360	10·	648	5·63	722	9 89	480	13 33	167	1·72
Grand Total ...	...	3,573	99·38	8,728	75 89	5,957	81·60	4,260	118 33	6,024	62 10

Species	Diameter class.	Compartment 6, area 111 acres.		Compartment 7, area 57 acres.		Compartment 8, area 68 acres.		Compartment 9, area 65 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	282	2·54	150	2·63	17	·25	24	·36
	II.	858	7·72	335	5·87	131	1·92	235	3·61
	III.	1,180	10 63	498	8·73	239	3·51	522	8·03
	IV.	2,398	21·60	884	15 50	1,593	23·42	835	12·84
Total ...	...	4,718	42·50	1,867	32·75	1,980	29 11	1,616	24·86
Bánj	I.	...	...	...	...	7	·10	37	·56
	II.	..	...	2	·03	37	·54	111	1·70
	III.	12	·10	11	·19	291	4·27	351	5·55
	IV.	24	·21	10	·17	300	4·41	889	13·67
Total ...	...	36	·32	23	·40	635	9·33	1,388	21·35
Ayír .. .	I.	...	.	...	...	...	...	2	·03
	II		·1	...	...	4	·05	3	·04
	III		...	...	...	41	·60	78	1·20
	IV	6	·05	5	·08	296	4 35	351	5·09
Total ...	.	6	·05	5	·08	341	5·01	431	6·67
Burána	I	...	..	...	...	8	·11	18	·27
	II	...	...	...	...	29	·42	47	·72
	III				...	150	2·20	121	1 86
	IV	1	·01	1	·01	375	5·51	365	5 61
Total ...	...	1	·01	1	·01	562	8 26	551	8·47
Miscellaneous ..	I	1	·01	..		4	·05	7	·10
	II.	2	·01	...		6	·08	17	·26
	III.	1	01	1	·01	11	·16	83	1·27
	IV	31	·27	5	·08	70	1 02	358	5·50
Total ...	...	35	·31	6	·10	91	1 33	465	7·15
Grand Total ...	...	4,706	43 20	1,902	33·35	3,609	53 07	4,454	68 52

Compartment 10, area 72 acres.		Compartment 11, area 58 acres.		Compartment 12, area 60 acres.		Compartment 13, area 27 acres.		Entire forest, area 875 acres.	
Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
25	·34	31	·53	16	·26	4	·14	635	·72
232	3·22	245	4·22	245	4·08	28	1·03	2,849	3·25
740	10·27	662	11·41	884	14·73	270	10·	7,091	8·10
1,866	25·91	734	12·65	2,010	33·5	988	36·59	16,520	18·88
2,863	39·76	1,672	28·82	3,155	52·58	1,290	47·77	27,095	30·96
61	·84	10	·17	6	·10	...	...	540	·61
65	·90	42	·72	5	·08	...	...	1,158	1·32
161	2·23	72	1·24	86	1·43	3	·11	4,060	4·64
578	8.02	356	6:10	340	5·66	4	·14	11,099	12·68
865	12·01	480	8·27	437	7·28	7	·25	16,857	19·26
...	...	...	...	...	...	...	...	3	·01
6	·08	72	1·24	5	·08	...	...	111	·12
78	1.08	60	1·03	50	·83	32	1·18	575	·65
705	9·79	346	5·96	571	9·51	156	5·77	4,044	4·62
789	10·95	478	8·24	626	10·43	188	6·96	4,733	5·40
48	·66	25	·43	14	·23	...	...	164	·18
112	1·52	48	·82	11	·18	...	...	408	·46
451	6·26	151	2·60	140	2·33	5	·18	1,778	2·03
1,180	16·38	462	7·96	661	11·01	36	1·33	5,493	6·27
1,791	24·87	686	11·82	826	13·76	41	1·51	7,843	8·96
7	·09	1	·01	1	·01	1	·03	59	·06
12	·16	1	·01	3	·05	2	·07	89	·10
32	·44	18	·31	13	·21	2	·07	476	·54
196	2·72	154	2·65	90	1·50	35	1·29	2,918	3·33
247	3·43	174	3·	107	1·78	40	1·48	3,542	4·04
6,555	91·04	3,490	60·17	5,151	85·85	1,566	58·	60,070	68·65

Above 6,400 feet the stock consists chiefly of bánj and buráns, with a few chír here and there. Below that elevation chír is almost pure, except in the deeper ravines and gullies, along which bands of the higher type run down. In many places scattered oak coppice, struggling against the heavy grazing and constant lopping, occurs under the chír. The stock is generally in the pole stage. There are a great many blanks and glades, the result of former cultivation and subsequent heavy grazing. Leaving out these areas, the mean density of the forest is as high as 0·6 ; but at many points the chír trees are stunted, although the young poles are coming on well.

Reproduction, on account of the heavy grazing, is far from satisfactory. Where bánj grows numerous bushes of it are met with, but new seedlings are very rare; while in chír forest, although there is a sprinkling of recent seedlings nearly everywhere, still the older advance growth is very insufficiently represented.

Fire-conservancy.—The statistics of fire-conservancy since the inception of special measures are as follows :—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total.	Cost. Per acre actually protected.
						Rs. a. p.	Pies.
1881-82 ...	1,210	...	...	...	1,210	83 2 9	13·1
1882-83 ...	1,210	...	...	...	1,210	65 11 11	10·4
1883-84 ...	1,210	13	1	13	1,197	68 15 5	10·0
1884-85 ...	1,210	...	...	...	1,210	26 14 0	4.2
1885-86 ...	1,210	...	...	...	1,210	15 15 9	2·5
Total ...	6,050	13	1	13	6,037	260 11 10	8·2

Rights.—The undermentioned villages are allowed to exercise the rights mentioned against their names:—

Number.	Name of villages having rights.	Description of rights. Grazing.	Fodder grass.	Firewood from fallen wood.	Fodder grass for sale.	Wood for agricultural implements, with sanction of forest officer.	Grass for thatching.	Timber for building, with sanction of forest officer.	Green leaves.	Dry leaves.	Stones for building.	Slates.	Charcoal for blacksmiths, with sanction of forest officer.	Bark of creepers.	Fruits and roots.	Fishing.	Irrigation channels.	Water for mills.	Burning ghâts.	Limestone.	Bamboos and bâbar.
Chaugôn.	Jainoli	R	R	R	...	R	...	R	R	R	R	...	R	...	R	...	...	...	...	...	...
	Tunakot	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Dowrah	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Bajina	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Bajowl	...	...	...	...	R	...	R	...	R	...	...	R	...	...	...	...	...	...	...	...
	Bamson	...	...	...	...	R	...	R	...	R	...	...	R	...	...	...	...	...	...	...	...
	Silangi	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Tunia	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Odewra	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Jogyari	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Ghingari	R	R	R	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...
	Chamoli	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Bhargâon	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Pipalkhand	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Oprari	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Pilkholi	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...
	Khagyar	...	...	R	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...
	Kotya	...	...	R	...	R	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...
	Ruma	...	...	...	...	R	...	R	...	...	...	...	...	...	...	...	...	...	...	...	...
	Tana	R	R	R	...	R	...	R	...	R	...	...	R	...	R	...	...	...	...	...	...

The grazing rights have been regulated in detail as follows :—

No.	Name of patti.	Mauza.	Number of head of— Cows.	Buffaloes.	Sheep.	Goats.	Total.
	Chaugúon	Jainoli	98	2	...	46	146
		Tunakot	60	...	...	36	96
		Dowrah	68	...	...	70	138
		Bajina	116	...	...	182	298
		Silangi	152	4	...	98	254
		Tunia	32	...	...	...	32
		Odyura	14	...	...	...	14
		Jogyari	212	12	...	48	272
		Ghigari	108	10	...	56	174
		Chamoli	156	4	...	34	194
		Bhargaon	140	4	...	60	204
		Pipalkhand	78	...	...	84	162
		Oprari	128	4	...	...	132
		Pilkholi	176	10	...	18	204
		Total ...	1,538	50	...	732	2,320
		Average number per acre ...	1·8	0·1	...	0·8	2·7

As regards trees, the numbers they have actually received on requisition during the past five years are shown in the subjoined statement:—

Forest.	Year.	Chir. Trees.	Chir. Poles.	Oaks. Trees.	Oaks. Poles.	Miscellaneous. Trees.	Miscellaneous. Poles.	Total. Trees.	Total. Poles.	Grand Total.
Chaubattia ...	1881-82	33	125	...	5	...	...	33	130	163
	1882-83	45	135	...	38	...	...	45	173	218
	1883-84	65	161	...	16	...	...	65	177	242
	1884-85	28	105	...	40	...	...	28	145	173
	1885-86	37	207		...	...	...	37	207	244
Totals for 5 years ...	...	208	733	...	99	...	...	208	832	1,040
Average per annum ...	...	42	146	...	20	...	...	42	166	208

From 1871-72, when the forest first came under departmental control, to 1880-81 they were given dundárs and bansás as follows :—

	1871-72.	1872-73.	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	Total.
Dundárs	97	704	612	147	113	306	76	30	88	61	2,204
Bansás	23	460	400	99	98	704	1,590	...	312	256	3,942

Chaubattia East, 1.

Boundaries.—North, south, and west, boundary of forest; east, compartment 2.

Area.—36 acres, of which 3 unproductive.

Configuration and aspect.—Mainly south-westerly or southerly slopes of 10° to 15° above and 20° to 35° below.

Elevation.—Maximum 6,600 feet, minimum 6,150 feet, mean 6,360 feet.

Soil and underlying rock.—Soil sandy, shallow, resting on crumbling micaceous, rather coarse-grained schists.

Stock.—Broad-leaved species (bánj, ayár, buráns, holly, káphal, &c.) line the side of the ravines, while, as we near the crests of the spurs, chir, in the stage of very young poles, enters and increases in proportion until it is the predominant tree. Mean density 0·5, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	...	...	...	...	...	...	80	640	80	640
Oaks	29	2,088	115	2,415	233	2,097	2,288	6,864	2,665	13,464
Miscellaneous	...	...	6	84	173	1,384	654	1,308	833	2,776
Total ...	29	2,088	121	2,499	406	3,481	3,022	8,822	3,578	16,880

Reproduction.—Co-efficient of completeness, 0·6. Mainly broad-leaved species, coppice bushes of bánj being abundant.

Accessibility.—One mile of coolie carriage to commissariat depôt at Chaubattia.

Chaubattia East, 2.

Boundaries.—North, boundary of forest and compartment 3; east, compartments 3 and 5; south and west, boundary of forest and compartment 1.

Area.—115 acres, of which 10 unproductive.

Enclosed village lands.—Chaks Gunbar Ijar and Timlkholi, respective areas 3·2 and 2·1 acres.

Configuration and aspect.—The compartment occupies both sides of a spur coming down south-east between two streams running in deep ravines. South-westerly and easterly aspects prevail. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,700 feet, minimum 5,800 feet, mean 6,300 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—On south-westerly aspects as in compartment 1. On easterly aspects nearly pure, badly grown chír. Mean density 0·5, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	31	2,325	196	8,820	864	17,280	2,163	17,304	3,254	45,729
Oaks	82	5,904	231	4,851	1,069	9,621	2,120	6,360	3,502	26,736
Miscellaneous	15	450	48	672	206	1,648	1,703	3,406	1,972	6,176
Total ...	128	8,679	475	14,343	2,139	28,549	5,986	27,070	8,728	78,641

Reproduction.—On south-westerly aspects as in compartment 1. Elsewhere co-efficient of completeness only 0·3, due to heavy grazing.

Accessibility.—1½ miles on coolies to commissariat depôt at Chaubattia.

Chaubattia East, 3.

Boundaries.—North and west, boundary of forests: east, compartments 4 and 5 and cultivation chak Chulási; south and west, compartment 2.

Area.—73 acres, of which 8 unproductive.

Enclosed village lands.—Chak Kath Patia, 8·1 acres.

Configuration and aspect.—A series of flat-crested spurs, increasing in lengt from west to east and running down south-east or south with deep ravines between. Ruling gradients along crests of spurs 8° to 15°, along flanks 30° to 35°. Exposure south-westerly, southerly, or south-easterly.

Elevation.—Maximum 6,703 feet minimum 6,250 feet, mean 6,500 feet.

Soil and underlying rock.—Soil generally deeper than in compartments 1 and 2; excellent for bánj and, where the elevation allows, for chír.

Stock.—On crests of spurs (⅓th of compartment) principally an open forest of chír. Mean density 0·3, quality 0·2. Elsewhere mainly oak, with abundant buráns at the higher elevation. Mean density 0·6, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	8	225	28	1,260	113	2,260	497	3,976	641	7,721
Oaks	181	13,032	265	3,565	726	6,534	1,653	4,959	2,825	30,090
Miscellaneous	42	1,260	98	1,372	515	4,120	1,836	3,672	2,491	10,424
Total ..	226	14,517	391	6,197	1,354	12,914	3,986	12,507	5,957	48,235

Reproduction.—Co-efficient of completeness in chír area, 0·2; in broad-leaved area, 0·4. In either place recent reproduction rare, owing to heavy grazing.

Accessibility.—1½ miles on coolies to commissariat depôt at Chaubattia.

Chaubattia East, 4.

Boundaries.—North, boundary of forest; east, joint cultivation chak Bajardeo and Payán Ijar and compartment 9; south, compartment 5 and cultivation chak Kimu Ijar; west, compartment 3 and cultivation chak Chulási.

Area.—36 acres, of which 4 unproductive.

Configuration and aspect.—Mainly southerly or south-westerly slopes of 15° to 30°.

Elevation.—Maximum 6,814 feet, minimum 6,320 feet, mean 6,600 feet.

Soil and underlying rock.—As in compartment 3.

Stock.—Appreciably fuller and better than in compartment 3, especially in the broad-leaved area, where the lower classes are more abundant.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	...	...	10	450	152	3,040	245	1,960	407	5,450
Oaks	88	6,336	172	3,612	491	4,446	1,349	4,047	2,103	18,441
Miscellaneous	26	780	47	658	291	2,328	1,386	2,772	1,750	6,538
Total ...	114	7,116	229	4,720	937	9,814	2,980	8,779	4,260	30,429

Reproduction.—Slightly fuller and more advanced than in compartment 3.

Accessibility.—About 1¾ miles on coolies to commissariat depôt at Chaubattia.

Chaubattia East, 5

Boundaries.—North, compartment 4 and cultivation chak Kimu Ijar (I); east, compartments 9 and 8; south, compartments 9 and 7 and cultivation chak Dolkhet; west, boundary of forest and compartments 2 and 3.

Area.—97 acres, of which 10 unproductive.

Configuration and aspect.—Mainly south-westerly slopes of from 30° to 50° and falling in scarps and ledges. About 5 acres of open flat ground at top.

Soil and underlying rock.—As in compartment 5.

Stock.—On lower slopes principally chír poles; on upper slopes and in ravines and deeper gullies bánj with ayár, buráns, alder, mehal, &c. The trees are all short-boled and many are badly twisted. Mean density 0·5, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	52	3,900	306	13,770	967	19,340	2,227	17,816	3,552	54,826
Oaks	39	2,808	113	2,373	551	4,959	1,188	3,564	1,891	13,704
Miscellaneous	6	180	29	406	126	1,008	420	840	581	2,434
Total ...	97	6,888	448	16,549	644	25,307	3,835	22,220	6,028	70,964

Reproduction.—Co-efficient of completeness in bánj area 0·6, in chír area 0·2, recent seedlings being scarce.

Accessibility.—2½ miles on coolies to commissariat depôt at Chaubattia.

Chaubattia East, 6.

Boundaries.—North, compartment 5 and cultivation chak Dolkhet; east, compartment 7 and cultivation chak Gáontheli; south and west, boundary of forest.

Area.—111 acres, of which 10 unproductive.

Configuration and aspect.—Mainly fairly uniform south-westerly slopes of 30° to 45° overhanging the Bagri nála.

Elevation.—Maximum 6,280 feet, minimum 5,100 feet, mean 5,550 feet.

Soil and underlying rock.—Rather shallow and more stony than in compartment.

Stock.—Almost pure chír, the trees, being stunted and deformed. Bottom of slopes very bare. Mean density in rest of crop 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II		Girth—class III		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	282	21,150	858	38,610	1,180	23,600	2,398	19,184	4,718	102,544
Oaks	...	...	...	..	12	108	24	72	36	180
Miscellaneous	1	30	2	28	1	8	38	76	42	142
Total .	283	21,180	860	38,638	1,193	23,716	2,460	19,332	4,796	102,866

Reproduction.—Mean co-efficient of completeness, 0·4. A fair sprinkling of seedlings in most places, the grazing being generally light by reason of steepness of ground.

Accessibility.—3 miles on coolies to commissariat depôt at Chaubattia.

Chaubattia East 7.

Boundaries.—North, compartments 5 and 8; east, outer boundary of forest; south and west, compartment 6 and cultivation chak Gáontheli.

Area.—57 acres, of which 5 unproductive.

Configuration and aspect.—Southerly and easterly slopes forming the basin of a small feeder of the Ghát gád. Ruling gradients 25° to 45°.

Elevation.—Maximum 6,313 feet, minimum 5,100 feet, mean 5,600 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—As in compartment 6, but bottom of slopes less bare.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	150	11.250	335	15,075	498	9,960	884	7,072	1,867	43,357
Oaks	...	...	2	42	11	99	10	30	23	171
Miscellaneous	...	...	...	...	1	8	11	22	12	30
Total ...	150	11,250	337	15,117	510	10,067	905	7,124	1,902	43,558

Reproduction.—As in compartment 6, but rather older.

Accessibility.—3 miles on coolies to commissariat depôt at Chaubattia.

Chaubattia East 8.

Boundaries.—North, compartment 9 and cultivation chaks Orkhets, Malla and Talla; east, boundary of forest (a very sinuous line); south and west, compartments 7 and 5.

Area.—68 acres, of which 6 unproductive.

Configuration and aspect.—Easterly slopes of 20° to 40°.

Elevation.—Maximum 6,450 feet, minimum 5,700 feet, mean 6,150 feet.

Soil and underlying rock.—As in compartment 6.

Stock.—The lower slopes bear principally chír pole forest of average density 0·6. Above that chír continues, but the trees are older and further apart. At upper end there is principally bánj, buráns, and ayár forest with a mean density of 0·7. Average figure of quality 0 5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	17	1,275	131	5,805	239	4,780	1,593	12,744	1,980	24,694
Oaks	7	504	37	777	291	2,619	300	900	635	4,800
Miscellaneous	12	360	39	546	202	1,616	741	1,482	994	4,004
Total ...	36	2,139	207	7,218	732	9,015	1,634	15,126	3,609	33,498

Reproduction.—Mean co-efficient of completeness in broad-leaved forest, 0·5; in pine forest 0 3, but very much higher on the lower slopes.

Accessibility.—2¾ miles on coolies to Commissariat depôt at Chaubattia.

Chaubattia East 9.

Boundaries.—North, compartment 10; north and east, compartment 11; south, boundary of forest, compartment 8, and Orkhets, Malla and Talla; west, compartments 5 and 4 and joint cultivation—chak Bajardeo and Paián Ijar and one of the chaks of Kimu Ijar.

Area.—65 acres, of which 5 unproductive.

Enclosed village lands.—Chaks Ureni and Wárkhet, each 0·8 acre.

Configuration and aspect.—Principally uniform easterly and south-westerly slopes of 18° to 30°, forming the basin of the Johrái Ráo, a stream flowing south-east.

Elevation.—Maximum 6,800 feet, minimum 6,000 feet, mean 6,400 feet.

Soil and underlying rock.—Soil sandy generally shallow and dry; excellent for mixed chír and bánj.

Stock.—Pure chír on crests of spurs, mixed chír and bánj along main water-shed ridge, and bánj, with ayár, buráns, and miscellaneous species in the ravines, the last most abundant in the deeper and moister depressions. Mean density 0·5, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	24	1,800	235	10,575	522	10,440	835	6,680	1,616	29,495
Oaks	37	2,664	111	2,331	351	3,159	839	2,667	1,388	10,821
Miscellaneous	27	810	67	938	282	2,256	1,074	2,148	1,450	6,152
Total ...	88	5,274	413	13,844	1,155	15,855	2,798	10,495	4,454	46,468

Reproduction.—A fair sprinkling of young chír seedlings in most places; saplings and low poles of chír less numerous. Oak bushes abundant everywhere, except on crests of spurs. Co-efficient of completeness, 0·5.

Accessibility.—2 miles on coolies to commissariat depôt at Chaubattia.

Chaubattia East 10.

Boundaries.—North and west boundary of forest (Ránikhet reserve and Cantonment) and cultivation chak Bajardeo ; east and south, compartments 13, 12, 11, and 9 and cultivation chaks Bhukura khets Malla and Talla, Thára Shim and Bhaura Ijar.

Area.—72 acres, of which 6 unproductive.

Enclosed village lands.—Chak Bajardeo, area 1·9 acres.

Configuration and aspect.—Mainly northerly slopes of 20° to 35°, with a few scarps at the bottom.

Elevation.—Maximum 6,750 feet, minimum 5,200 feet, mean 6,200 feet.

Soil and underlying rock.—Soil as in 9, but richer and moister in the ravines ; excellent for mixed chír and bánj.

Stock.—Mixed bánj, buráns, chír, and ayár at the top ; oak, ayár, and miscellaneous trees in the deeper ravines ; nearly pure chir elsewhere; mean density 0·6, quality 0·5. All broad-leaved species heavily lopped.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	25	1,875	232	10,440	740	14,800	1,866	14,928	2,863	42,043
Oaks	61	4,392	65	1,365	161	1,449	578	1,734	865	8,940
Miscellaneous	55	1,650	130	1,820	561	4,488	2,081	4,162	2,827	12,120
Total ...	141	917	427	13,625	1,462	20,737	4,525	20,824	6,555	63,103

Reproduction.—Co-efficient of completeness only 0·5, due to rather heavy grazing. A fair sprinkling of chír seedlings, saplings, and low poles everywhere in chír forest, whether pure or mixed. Recent seedlings of broad-leaved species rare, but coppice bushes abundant in the ravines and at top of compartment.

Accessibility.—Two miles on coolies to Commissariat depôt at Chaubattia.

Chaubattia East 11.

Boundaries.—North, compartments 10 and 12 and cultivation Chak Bhaura Ijar ; east, boundary of forest (village lands) ; south and west, compartment 9.

Area.—58 acres, of which 5 unproductive.

Enclosed village lands.—Chak Lunia Kháta, area 2 acres.

Configuration and aspect.—Principally rugged easterly slopes of very variable gradients. Many ravines with steep sides.

Elevation.—Maximum 6,650 feet, minimum 6,050 feet, mean 6,350 feet.

Soil and underlying rock.—Soil sandy, generally dry, resting on hard grey sandstone full of veins of quartz ; excellent for mixed chír and bánj.

Stock.—At the head of ravine forming the top of the compartment chiefly bánj, buráns, and ayár. Bánj coppice and pollards run down all the ravines. Elsewhere principally middle-aged chír forest. Mean density 0·4, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	31	2,325	245	11,025	662	13,240	734	5,872	1,672	32,462
Oaks	10	720	42	882	72	648	356	1,068	440	3,318
Miscellaneous	26	780	121	1,694	229	1,832	962	1,924	1,338	6,230
Total ...	67	3,825	408	13,601	963	15,720	2,052	8,864	3,490	42,010

Reproduction.—A fair sprinkling of seedlings and saplings of chír in chír forest and numerous bánj bushes in the ravines. Grazing heavy.

Accessibility.—Two miles on coolies to Commissariat depôt at Chaubattia.

Chaubattia East 12.

Boundaries.—North and west, compartments 13 and 10 and cultivation chaks Chalina, Bhukura khets Talla and Malla, Thara Sim and Bhaura Ijar ; east, boundary of forest (village lands) ; south, compartment 11.

Area.—60 acres, of which 5 unproductive.

Enclosed village lands.—Chak Chaura Sela, area 1·2 acres.

Configuration and aspects.—Mainly rugged north-easterly slopes of very variable gradients.

Elevation.—Maximum 6,550 feet, minimum 5,600 feet, mean 6,100 feet.

Soil and underlying rock.—As in compartment 11.

Stock.—Principally chír pole forest, except at the top and in the deeper ravines, where buráns, ayár, and oaks predominate. Mean density 0·6 ; quality in chír area 0 5, elsewhere 0·2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	16	1,200	245	11,025	884	17,680	2,010	16,080	3,155	45,985
Oaks	6	432	5	105	86	774	340	1,020	437	2,381
Miscellaneous	15	450	19	266	203	1,624	1,322	2,644	1,559	4,984
Total ...	37	2,082	269	11,396	1,173	20,078	3,672	19,744	5,151	53,300

Reproduction.—As in compartment 11.

Accessibility.—Two miles on coolies to Commissariat depôt at Chaubattia.

Chaubattia East 13.

Boundaries.—North and west, Ránikhet reserve and compartment 10 ; east boundary of forest (village lands) ; south, compartment 12 and cultivation chaks Chalnia and Bhukura khet Malla.

Area.—27 acres, of which 3 unproductive.

Configuration and aspects.—North-easterly or north-westerly slopes of 20° to 35,° forming for the most part the deep narrow basin of a small feeder of the Ujani gád.

Elevation.—Maximum 5,970 feet, minimum 5,200 feet, mean 5,650 feet.

Soil and underlying rock.—Soil sandy, shallow, dry, resting on conglomeratic, highly micaceous, easily disintegrating sandstone ; excellent for chír.

Stock.—Mainly young pole forest of chír, mean density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	4	300	28	1,260	270	5,400	988	7,904	1,290	14,864
Oaks	...	...	...	...	3	27	4	12	7	39
Miscellaneous	1	30	2	28	39	312	227	454	269	824
Total ...	5	330	30	1,288	312	5,739	1,219	8,370	1,566	15,727

Reproduction.—A fair sprinkling of every class of advance growth of chír everywhere, and of bánj and ayár bushes in the ravines and gullies.

Accessibility.—2½ miles on coolies to Commissariat depôt at Chaubattia.

CHAPTER X.—THE CHAUBATTIA FOREST, WEST.

Situation and boundaries.—This forest extends between 29°-36′-20″ and 29°-37′-40½′ north latitude and 79°-28′-7″ and 79°-29′-58½″ east longitude. It is situated entirely in Patti Malli Doti of pargana Phaldákot. The whole of its north-eastern boundary (a length of nearly 3 miles) marches with that of the Cantonment. At every other point it is bordered by village lands.

Area.—335 acres, of which 33 unproductive.

Number of Compartments.—5.

Topography.—The forest extends in a long narrow belt along the westerly and south-westerly slopes below the great Chaubattia ridge. The hill side is channelled by numerous ravines and gullies, which carry away the drainage westward into the Betal gadhera. The gradients generally range between 25° and 40°, but very much steeper slopes occur.

Elevation.—Maximum 6,780 feet, minimum 4,300 feet, mean 5,700 feet.

Soil and underlying rock.—The hill side is formed of schistose gneiss, which, splitting and breaking up easily, constitutes a good sub-soil and yields a free soil, capable of reaching a very high degree of fertility if kept under broad-leaved, or at least mixed broad-leaved and conifer, forest.

Stock.—The subjoined statement gives the results of the enumeration surveys:—

Species.	Diameter-class.	Compartment 1, area 74 acres.		Compartment 2, area 74 acres.		Compartment 3, area 91 acres.		Compartment 4, area 43 acres.		Compartment 5, area 53 acres.		Entire forest, area 335 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	12	·16	52	·70	88	·96	154	3·58	168	3·17	474	1·41
	II.	82	1·10	122	1·64	126	1·38	216	5·02	360	6 79	906	2·70
	III.	493	6·66	691	9·35	475	·522	326	7·58	455	8·58	2,440	7·31
	IV.	564	7·62	2,343	31·66	819	·900	1,103	25·65	101	1·90	4,930	14·71
Total ...	...	1,151	15·55	3,208	43·35	1,508	16·57	1,799	41·83	1,084	20·45	8,750	26 14
Bánj ...	I.	208	2·81	1	·01	12	·13	10	·23	...	...	231	·69
	II.	246	3·32	41	·55	45	·49	26	·60	1	·01	359	1·07
	III.	776	10·48	296	4·00	113	1·24	58	1·35	4	·07	1,247	3·72
	IV.	644	8·70	343	4·63	151	1·66	47	1·09	2	·03	1,187	3·54
Total ...	...	1,874	25·32	681	9·20	321	3·52	141	3·27	7	·13	3,024	9·02
Ayár ...	I.	...	...	...	...	...	...	...	...	...	...	...	...
	II.	7	·09	...	...	...	...	1	·02	...	...	8	·02
	III.	27	·36	7	·09	6	·06	...	...	7	·13	47	·14
	IV.	193	2·60	45	·60	10	·10	16	·37	44	·83	308	·91
Total ...	...	227	3·06	52	·79	16	·17	17	·39	51	·96	363	1·08
Buráns ...	I.	18	·24	...	...	...	...	1	·02	...	...	19	·05
	II.	50	·67	1	·01	...	...	...	...	...	...	51	·15
	III.	125	1·69	1	·01	...	...	1	·02	1	·01	128	·38
	IV.	198	2·67	2	·02	1	·01	1	·02	...	...	202	...
Total ...	...	391	5·27	4	·05	1	·01	3	·06	1	·01	400	1·19
Miscellaneous,	I.	9	·12	2	·02	...	...	...	...	2	·03	13	·03
	II.	10	·13	5	·06	1	·01	6	·14	9	·17	31	·08
	III.	33	·44	16	·21	1	·01	8	·18	28	·52	86	·25
	IV.	160	2·16	47	·63	36	·28	9	·20	26	·49	268	·80
Total ...	...	212	2·86	70	·94	38	·30	23	·53	65	1·22	398	1·18
Grand Total,	...	3,855	52·09	4,015	54·25	1,874	20·59	1,983	46·11	1,208	22·79	12,935	38·61

Only a very small portion of the area is above 6,450 feet, the limit of pure chír forest, so that the stock is mainly pure chír in the older pole stage, with a mean density of a little under 0·4. The trees are on the whole better grown than in Chaubattia east.

The state of the reproduction is still more unsatisfactory than in Chaubattia East, the advance growth consisting principally of a few saplings and low poles.

Fire-conservancy.—For the reason given under the next head this forest has been treated as part of a larger area and no separate figures for it are available. The figures given under Chaubattia east comprise those for both blocks taken jointly.

Rights.—This forest, although forming a detached block, is part and parcel of the same forest as Chaubattia east, under which the rights will be found described.

Chaubattia West 1.

Boundaries.—North and east, forest boundary (Cantonment); south, forest boundary (village lands); west, compartment 2.

Areas.—74 acres, of which 8 unproductive.

Configuration and aspect.—South-westerly slopes of 30° to 45°, with numerous scarps.

Elevation.—Maximum 6,780 feet, minimum 5,600 feet, mean 6,350 feet.

Soil and underlying rock.—Soil sandy, generally shallow, often exposing the underlying micaceous schistose coarse-grained sandstone; good for chír or bánj according to elevation.

Stock.—Above 6,450 feet (above ¼th of area) nearly pure oak, with a mean density of 0·6 and quality 0·3. Below that principally chír pole forest, with a mean density of 0·4 and quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	12	900	82	3,690	493	9,860	564	4,512	1,151	18,962
Oaks	208	14,976	246	5,166	776	6,984	644	1,932	1,874	29,058
Miscellaneous	27	810	67	938	185	1,480	551	1,102	830	4,330
Total ...	247	16,686	395	9,794	1,454	18,324	1,759	7,546	3,855	52,350

Reproduction.—In the upper portion new oak seedlings rare, but bushes fairly abundant. In pine forest chír seedlings are fairly well sprinkled everywhere, but saplings and low poles occur only scattered. Mean co-efficient of completeness, 0·3.

Accessibility.—¾ mile on coolies to Commissariat depôt at Chaubattia.

Chaubattia West 2.

Boundaries.—North and east, compartment 3 and boundary of forest (Cantonment); east compartment 1; south and west boundary of forest village lands.

Area.—74 acres, of which 8 unproductive.

Configuration and aspect.—Rugged, south-westerly slopes of 30° to 50°.

Elevation.—Maximum 6,300 feet, minimum 5,300 feet, mean 5,950 feet.

Soil and underlying rock.—Soil rather better than in compartment 1, the underlying rock being softer and more schistose. Excellent soil for mixed chír and bánj.

Stock.—Chiefly chír pole forest overtopping old bánj coppice, the result of repeated lopping. Mean density 0·5, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	52	3,900	122	5,490	691	13,820	2,343	18,744	3,208	41,954
Oaks	1	72	41	861	296	2,664	343	1,029	681	4,626
Miscellaneous	2	60	6	84	24	192	94	188	126	524
Total ...	55	4,032	169	6,435	1,011	16,676	2,780	19,961	4,015	47,104

Reproduction.—Saplings and low poles of chír scattered throughout the compartment; of seedlings only a sprinkling, which is, however, good in places. Mean co-efficient of completeness, 0·4.

Accessibility.—1¼ miles on coolies to Commissariat depôt at Chaubattia.

Chaubattia West 3.

Boundaries.—North and west, compartment 4; north and east, boundary of forest (Cantonment); south, compartment 2 and boundary of forest (village lands).

Area.—91 acres, of which 8 unproductive.

Configuration and aspect.—As in compartment 2.

Elevation.—Maximum 6,100 feet, minimum 5,050 feet, mean 5,550 feet.

Soil and underlying rock.—As in compartment 2.

Stock.—A very inferior type of the stock in compartment 3. Mean density 0·2, quality 0·2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	88	6,600	126	5,670	475	9,500	819	6,552	1,508	28,322
Oaks	12	864	45	945	113	1,017	151	453	321	3,279
Miscellaneous	...	...	1	14	7	56	37	74	45	144
Total ...	100	7,464	172	6,629	595	10,573	1,007	7,079	1,874	31,745

Reproduction.—Mean co-efficient of completeness, 0·1: only a sprinkling of seedlings.

Accessibility.—2 miles on coolies to Commissariat depôt at Chaubattia.

Chaubattia West 4.

Boundaries.—North, compartment 5 and boundary of forest (Cantonment); east and south, compartment 3; west, boundary of forest (village lands).

Area.—43 acres, of which 4 unproductive.

Configuration and aspect.—Mainly westerly slopes of similar gradient to those in compartment 2.

Elevation.—Maximun 6,030 feet, minimum 5,120 feet, mean 5,500 feet.

Soil and underlying rock.—As in compartment 2.

Stock.—Principally old chír pole forest. Mean denstity 0·5, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	154	11,550	216	9,720	326	6,520	1,103	8,824	1,799	36,614
Oaks	10	720	26	546	58	522	47	141	141	1,929
Miscellaneous	1	30	7	98	9	72	26	52	43	252
Total ...	165	12,300	249	10,364	393	7,114	1,176	9,017	1,983	38,795

Reproduction.—As in compartment 2.

Accessibility.—2½ miles on coolies from Commissariat depôt at Chaubattia.

Chaubattia West 5.

Boundaries.—North, boundary of forest (Cantonment and village lands); east, boundary of forest (Cantonment); south, compartment 4 and boundary of forest (village lands); west, boundary of forest (village lands).

Area.—53 acres, of which 5 unproductive.

Configuration and aspect.—As in compartment 4, but ground more rugged.

Elevation.—Maximum 5,600 feet, minimum 4,300 feet, mean 4,950 feet.

Soil and underlying rock.—As in compartment 2.

Stock.—Principally an open middle-aged and even old forest of chír. Mean density 0·4, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	168	12,600	360	16,200	455	9,100	101	808	1,084	38,700
Oaks	...	...	1	21	4	36	2	6	7	63
Miscellaneous	2	60	9	126	36	288	70	140	117	614
Total ...	170	12,660	370	16,347	495	9,424	173	954	1,208	39,377

Reproduction.—Chiefly a sprinkling of young seedlings. Co-efficient of completeness, 0·2.

Accessibility.—2¾ miles on coolies to Commissariat depôt at Chaubattia.

CHAPTER XI.—THE RANIKHET RESERVE.

Situation and boundaries.—This forest lies between 29°37′ and 29°40′ north latitude and 79°29′ and 79°33′ east longitude, and is situated to the north of the Cantonment. The whole of its eastern and a small part of its southern boundary marches with those of village lands. On the north it adjoins, for about 2½ miles, the Padholi protected forest and for about 1½ miles the Dwársaon protected forest; on the west the small protected forest of Deolikhet borders it, and on the south the Chaubattia protected forest east touches it. Elsewhere, the greater length of its boundary, it is adjacent to the Cantonment.

Area.—4,931 acres, of which 297 unproductive.

Topography.—The area extends along several more or less parallel spurs running down east from the great ridge on which the Cantonment is situated. The hills are generally low and rounded, but in the south there are several high ridges and sharp spurs and the Káli gád, which divides the forest into two almost equal portions, runs in a deep valley.

Elevation.—Maximum 6,800 feet, minimum 4,750 feet, mean 5,490 feet.

Soil and underlying rock.—With the exception of a band of gneissic and quartzose rocks along the southern boundary, the underlying rock consists of mica schists. The soil is free, sandy, and never appreciably rich, except under broad-leaved trees. The Káli gád, the Káli Báo, and the Kála Jhippa streams flow all the year round.

Stock.—Principally chír pole forest, all the older and larger trees having been cut out. The only other type present is the upper broad-leaved one, which covers the ridges above 6,000 feet and lines and fringes the ravines and sides of water-courses.

The subjoined statement gives the results, after deduction of trees since removed, of an enumeration survey made by Mr. Brereton in 1878-79:—

Species.	Diameter-class.	Block I, area 912 acres.		Block II, area 930 acres.		Block III, area 1,108 acres.		Block IV, area 1,981 acres.		Entire block, area 4,931 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	453	0·49	503	0·54	328	0·29	782	0·39	2,066	0·45
	II.	5,548	6·08	7,185	7·73	4,533	4·09	5,142	2·60	22,408	4·94
	III.	9,600	10·52	8,100	8·71	6,300	5·69	8,000	4·04	32,000	0·64
	IV.	13,000	14·25	10,300	11·08	7,800	7·03	10,900	5·50	42,000	0·85
Total ...	...	28,601	31·36	26,088	28·06	18,061	17·11	24,824	12 53	98,474	19·97
Oaks ...	I.	122	0·13	412	0·46	334	0·30	280	0·14	1,148	0·23
	II.	496	0·54	1,170	1·26	1,369	1·23	1,372	0·68	4,407	0·89
	III.	800	0·87	1,850	1·99	1,650	1·48	1,700	0·85	6,000	1·21
	IV.	1,100	1·20	2,800	3·01	2,460	2·22	2,640	1·33	9,000	1·82
Total ...	...	2,518	2·76	6,232	6 70	5,813	5·24	5,992	3·02	20,555	4·16
Miscellaneous,	I.	4	...	95	0 10	34	0 03	15	...	148	0·30
	II.	137	0·15	445	0·48	1,371	1·22	1,087	0·54	3,040	0·61
	III.	1,000	1·09	1,360	1·46	4,210	3 79	3,430	1·78	10,000	2·03
	IV.	1,700	1·86	2,160	2 32	7,160	6·45	5,980	3·00	17,000	0·35
Total ...	...	2,841	3·11	4,060	4·36	12,775	11·52	10,512	5·30	30,188	6·12
Grand Total ...	...	33,960	37·23	36,380	39·11	37,549	33·88	41,328	20·86	149,217	30·26

Reproduction.—The forest having been protected since 1875, reproduction has made most excellent progress ; but this progress is limitted principally to chír, over the advance growth of which fellings may in many places be made pretty freely.

Fire-conservancy.—The following statement gives the progress and results of fire-conservancy:—

Year.	Number of acres attempted.	Number of acres burnt.	Number of fires.	Average acreage burnt in each fire.	Number of acres actually protected.	Cost. Total.	Cost. Per acre actually protected.
						Rs. a. p.	Pies.
1875-76	129	...	...	...	129	10 12 0	17·0
1876-77	4,931	...	...	...	4,931	429 3 9	16·7
1877-78	4,931	640	2	320	4,291	47 4 3	2·1
1878-79	4,931	70	2	35	4,861	109 1 11	4·3
1879-80	4,931	...	...	...	4,931	111 0 11	4·3
1880-81	4,931	...	...	...	4,931	58 7 7	2·2
1881-82	4,931	5	1	5	4,926	119 4 6	4·6
1882-83	4,931	10	3	3	4,921	114 11 4	4·4
1883-84	4,931	...	...	...	4,931	78 13 6	3·1
1884-85	4,931	...	...	...	4,931	43 2 0	1·6
1885-86	4,931	...	...	...	4,931	61 1 0	2 3
Total ...	49,439	725	8	91	48,714	1,082 14 9	4·2

SECTION I.—RÁNIKHET RESERVE, BLOCK I.

Boundaries.—North, Ranikhet-Almora cart-road separating it from Padholi protected forest and Cantonment lands of Upat; east, block IV with the Káli ráo between; south, the Káli gád separating it from block III and Ránikhet Cantonment; west, Deolikhet protected forest and military prison site.

Area.—912 acres, of which 47 unproductive.

Configuration and aspect.—Low hills with generally gently sloping sides contained between the Káli gád and Káli ráo, southerly aspects predominating.

Elevation.—Maximum 5,900 feet, minimum 5,310 feet, mean 5,540 feet.

Soil and underlying rock.—A sandy, generally dry soil, overlying mica schists. Excellent for chír and oak mixed.

Stock.—Principally a chír pole forest, with patches and belts of broad-leaved species in the ravines and on cool sheltered northerly slopes.

Reproduction.—Mainly chír ; excellent and quite fit to be rapidly uncovered.

The quantity of stock is shown in the subjoined statement :—

Species.	Diameter-class.	Compartment 1, area 39 acres.		Compartment 2, area 42 acres.		Compartment 3, area 71 acres.		Compartment 4, area 44 acres.		Compartment 5, area 49 acres.		Compartment 6, area 52 acres.		Compartment 7, area 66 acres		Compartment 8, area 65 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chir	I	13	0·33	20	0·47	59	0·83	25	0·57	11	0·22	52	1·00	48	0·73	36	0 57
	II·	277	7·10	366	8·72	484	6·82	343	7·80	341	6·96	427	8·21	488	7·39	401	6·26
	III·	320	8·21	480	11·43	600	8·45	700	15·90	710	14·49	530	10·19	900	13·64	840	13·12
	IV·	440	11·28	660	15·71	810	11·41	940	21·36	960	19 60	710	13·05	1,230	18 63	1,130	17·65
Total ...	...	1,050	26·92	1,526	36·33	1,953	27·51	2,008	45·63	2,022	41·27	1,719	33·05	2,666	40·39	2,407	37·60
Oak	I·	3	0·08	17	0 40	32	0·45	7	0·16	6	0·12	1	0·02	3	0·04	8	0·12
	II·	12	0 31	26	0·62	86	1·21	35	0 79	25	0·51	24	0·46	28	0·43	23	0·36
	III·	20	0·51	40	0·95	100	1·41	50	1·13	40	0·82	40	0·77	40	0 60	50	0·78
	IV·	30	0·76	60	1·43	140	1·97	70	1·60	60	1·22	50	0·96	60	0·91	70	1·10
Total ...	...	65	1·66	143	3·40	358	5·04	162	3·68	131	2·67	115	2·21	131	1·98	151	2·36
Miscellaneous	I·	...	...	1	0·02	...	...	2	0·05	...	...	...	...	...	...	...	...
	II·	4	0·10	13	0 31	14	0·21	2	0·05	7	0·14	2	0 04	1	0·01	17	0·26
	III·	20	0 51	50	1·90	80	1·13	50	1·13	60	1·22	40	0·77	30	0·45	120	1·88
	IV·	40	1 03	80	1·90	140	1·97	90	2·05	100	2·04	70	1·35	50	0·77	200	3·12
Total ...	...	64	1·64	144	3·43	234	3·30	144	3·28	167	3·40	112	2·16	81	1·23	337	5·26
Grand Total ...	...	1,179	30·23	1,813	43·16	2,545	35·85	2,314	52·59	2,320	47·34	1,946	37·42	2,878	43 60	2,895	45·22

Species.	Diameter-class.	Compartment 9, area 50 acres.		Compartment 10, area 61 acres.		Compartment 11, area 101 acres.		Compartment 12, area 89 acres.		Compartment 13, area 77 acres.		Compartment 14, area 62 acres.		Compartment 15, area 45 acres.		Entire block, area 912 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chir	I.	19	0·38	11	0·18	45	0·45	50	0·56	22	0·28	28	0·45	14	0·31	453	0·50
	II.	283	5·66	333	5·46	607	6·01	108	1·21	322	4·18	459	7·40	309	6·87	5,548	6·08
	III.	650	13·00	580	9·51	1,180	11·68	730	8·21	480	6·24	520	8·39	380	8·44	9,600	10·53
	IV.	890	17·80	790	12·95	1,590	15·74	990	11·12	660	8·57	700	11·29	500	11·11	13,000	14·25
Total ...	...	1,842	36·84	1,714	28·10	3,422	33·88	1,878	21·10	1,484	19·27	1,707	27·53	1,203	26·73	28,601	31·36
Oaks	I.	2	0·04	6	0·10	19	0·20	4	0·04	...	...	2	0·03	12	0·27	122	0·13
	II.	15	0·30	44	0·72	69	0·69	25	0·28	7	0·09	31	0·50	46	1·02	496	0·54
	III.	30	0·60	70	1·15	140	1·37	60	0·67	20	0·26	40	0·64	60	1·33	800	0·88
	IV.	40	0·80	90	1·47	180	1·77	80	0·90	30	0·39	60	0·97	80	1·78	1,100	1·21
Total ..		87	1·74	210	3·44	408	4·03	169	1·89	57	0·74	133	2·14	198	4·40	2,518	2·76
Miscellaneous	I.	...	...	...	...	1	0·01	...	...	...	...	...	...	...	...	4	0·01
	II.	5	0·10	18	0·29	21	0·21	3	0·03	1	0·01	14	0·22	15	0·33	137	0·15
	III.	70	1·40	140	2·30	150	1·48	40	0·45	10	0·13	60	0·96	80	1·79	1,000	1·09
	IV.	130	2·60	230	3·77	240	2·39	70	0·78	30	0·39	100	1·63	130	2·88	1,700	1·86
Total ...	...	205	4·10	388	6·36	412	4·09	113	1·26	41	0·53	174	2·81	225	5·00	2,841	3·11
Grand Total ...	...	2,134	42·68	2,312	37·90	4,242	42·00	2,160	24·26	1,582	20·54	2,014	32·48	1,626	36·13	33,960	37·23

Ranikhet Reserve I.1.

Boundaries.—North, outer boundary of forest (military prison site); east, compartment 2; south, outer boundary of forest (Cantonment); west, outer boundary of forest (protected forest of Deolikhet).

Area.—59 acres, of which 2 unproductive.

Configuration and aspect.—Rounded southerly and south-easterly slopes, forming mainly the basin of a small feeder of the Káli gád. Ruling gradients 15° to 25°.

Elevation.—Maximum 5,800 feet, minimum 5,480 feet, mean 5,680 feet.

Soil and underlying rock.—Soil free and sandy, seldom absent, resting on mica schists and a soft quartzite; excellent for chír and oak mixed.

Stock.—Principally middle-aged chír with some young bánj in the depressions. Density 0·4, quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	13	975	277	12,465	320	6,400	440	3,520	1,050	23,360
Oaks	3	216	12	252	20	180	30	90	65	738
Miscellaneous	...	...	4	56	20	160	40	80	64	296
Total ...	16	1,191	293	12,773	360	6,740	510	3,690	1,179	24,394

Reproduction.—Co-efficient of completeness, 0·8; mainly established chír. Saplings and poles numerous in lower half.

Accessibility.—An easy 1½ miles from Commissariat godown, of which about one along car - oad.

Ranikhet Reserve I 2.

Boundaries.—North, outer boundary of forest (military prison site); east, compartment 3; south, outer boundary of forest (Cantonment); west, compartment 1.

Area.—42 acres, of which 2 unproductive.

Configuration and aspect.—Mainly easterly, with two stretches of southerly, slopes forming western half of the basin of the Batua gád. Ruling gradients 15°—30°.

Elevation.—Maximum 5,870 feet, minimum 5,470 feet, mean 5,700 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—As in compartment 1, but gaps larger and more numerous, although mean density silghtly higher and quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	20	1,500	366	16,470	480	9,600	660	5,280	1,526	32,850
Oaks	17	1,224	26	546	40	360	60	180	143	2,310
Miscellaneous	1	30	13	182	50	400	80	160	144	772
Total ..	38	2,754	405	17,198	570	10,360	800	5,620	1,813	35,932

Reproduction.—As in compartment I, but a little more oak and some ayár in addition.

Accessibility,—Just a wee bit more coolie carriage than from compartment 1.

Ranikhet Reserve I. 3.

Boundaries.—North, outer boundary of forest (military prison site); east, compartments 11, 6, and 5, south, outer boundary of forest (Cantonment); west, compartment 2.

Area.—71 acres, of which 4 unproductive.

Configuration and aspect.—Mainly westerly slopes of 25° and 40° forming eastern portion of basin of the Batua gad.

Elevation.—Maximum 5,900 feet, minimum 5,450 feet, mean 5,740 feet.

Soil and underlying rock.—As in compartment 1.

Stock—As in compartment 2, but somewhat more open, and a slightly larger proportion of bánj.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	59	4,425	484	21,780	600	12,000	810	6,480	1,953	44,685
Oaks	32	2,304	86	1,806	100	900	140	420	358	5,430
Miscellaneous	...	...	14	196	80	640	140	280	234	1,116
Total ...	91	6,729	584	23,782	780	13,540	1,090	7,180	2,545	51,231

Reproduction.—Owing to steep gradients co-efficient of completeness only 0·6, in the proportion of 5 chír to 1 bánj.

Accessibility.—Slightly over ¼ mile more of coolie carriage than from compartment 1.

Ranikhet Reserve I. 4.

Boundaries—North and east, compartment 5; south outer boundary of forest (Cantonment); west, compartment 3.

Area.—44 acres, of which 3 unproductive.

Configuration and aspect.—Slopes of 20° to 36° running down south to the Kali gad, with minor easterly, south-easterly, and westerly aspects.

Elevation.—Maximum 5,090 feet, minimum 5,430 feet, mean 5,600 feet.

Soil and underlying rock.—Much as in compartment 1.

Stock.—Mainly young pole forest of chír, with broad-leaved species in the deeper ravines and at the botton. Density 0·6 quality 0·8.

Summary of valuation.

Special.	Girth—class I.		Girth—class II,		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	25	1,875	343	15,435	700	14,000	940	7,520	2,008	38,830
Oaks	7	504	36	735	50	450	70	210	162	1,899
Miscellaneous	2	60	2	28	50	400	90	180	144	668
Total . .	34	2,439	380	16,198	800	14,850	1,100	7,910	2,314	41,397

Reproduction.—Completely established. Co-efficient of completeness, 0·8. Low poles of chír adundant.

Accessibility.—One mile to cart-road, whence one more mile to Commissariat depôt. A good narrow bridle-path leading into the cantonment traverses lower end of compartment.

Ranikhet Reserve I. 5.

Boundaries.—North, compartment 11 ; west, compartment 6, south; outer boundary of forest (cantonment) ; west, compartments 3 and 4.

Area—49 acres, of which two unproductive.

Configuration and aspect.—Mainly easterly and south-easterly slopes of 20° to 30° forming the right half of the basin of the Kali gad.

Elevation —Maximum 5,720 feet, minimum 5,420 feet, mean 5,580 feet.

Soil and underlying rock.—Much as in compartment 1.

Stock.—As in compartment 4 but on the whole slightly less dense.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Mounds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	11	825	341	15,345	710	14,200	960	7,680	2,022	38,050
Oaks	6	432	25	525	40	360	60	180	131	1,497
Miscellaneous	...	...	7	98	60	480	100	200	167	778
Total ...	17	1,257	373	15,968	810	15,040	1,120	8,060	2,320	40,325

Reproduction.—Less advanced than in compartment 4. Mean co-efficient of completeness, 0·6. A small plantation of deodar of less than one acre.

Accessibility.—Barely ¼ mile further than compartment 4 ; traversed by same bridle-path.

Ranikhet Reserve I. 6. c

Boundaries.—North, compartments 11, 10, and 8; east, compartment 7 ; south, partly outer boundary of forest (Cantonment), partly II. (3); west, compartment 5.

Area.—52 acres, of which 3 unproductive.

Configuration and aspect.—Principally south-westerly slopes of 20° to 40,° forming left half of a feeder of the Kâli gad.

Elevation.—Maximum 5,874 feet, minimum 5,400 feet, mean 5,600 feet.

Soil and underlying rock.—Much as in compartment 1.

Stock.—Principally middle-aged chír forest. Density 0·4, quality 0 4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	52	3,900	427	19,215	530	10,600	710	5,680	1,719	39,395
Oaks	1	72	24	504	40	360	50	150	115	1,086
Miscellaneous	...	...	2	28	40	320	70	140	112	488
Total ...	53	3,972	453	19,747	610	11,280	830	5,970	1,946	40,969

Reproduction.—Tendency to form patches. Very young seedlings not numerous. Mean co-efficient of completeness, 0 6.

Accessibility.—A little less than 1½ miles from cart-road, whence a little more than a mile to commissariat depôt.

Ránikhet Reserve I. 7.

Boundaries.—North and east, compartment 8; south, II 3; west, compartment 6.

Area.—66 acres, of which 3 unproductive.

Configuration and aspect.—Principally southerly, south-easterly, and south-westerly slopes of 20° to 40°, drained into the Káli gád.

Elevation.—Maximum 5,760 feet, minimum 5,310 feet, mean 5,500 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally young pole forest of chír. Density 0·7, quality 0·7.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	48	3,600	488	21,960	900	18,000	1,230	9,840	2,666	53,400
Oaks	3	216	28	588	40	360	60	180	131	1,344
Miscellaneous	...	..	1	14	30	240	50	100	81	354
Total ...	51	3,816	517	22,562	970	18,600	1,340	10,120	2,878	55,098

Reproduction.—Mean co-efficient of completeness, 0·6. Mainly saplings of chír, with a slight mixture of bánj.

Accessibility.—About 1¾ miles from cart-road, whence a little more than a mile from Commissariat depôt. Traversed a little above the Káli gád by a good narrow bridle-road leading to cantonment just below Mr. Troup's estate.

Ranikhet Reserve I. 8.

Boundaries.—North, compartments 10 and 9; east, block IV, 7 and 8; south and west, compartments 7 and 6.

Area.—64 acres, of which 3 unproductive.

Configuration and aspect.—Partly a narrow bay forming the basin of a small stream flowing east into the Káli ráo, and partly north-easterly slopes drained directly into that Ráo. Ruling gradients 20° to 30°.

Elevation.—Maximum 5,874 feet, minimum 5,310 feet, mean 5,610 feet.

Soil and underlying rock—Much as in compartment 1.

Stock.—Principally chír pole forest, with bánj and other broad-leaved trees at the upper end. Mean density 0·7, quality 0·7.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	36	2,700	401	18,045	840	16,800	1,130	9,040	2,407	46,585
Oaks	8	576	23	483	50	450	70	210	151	1,719
Miscellaneous ...	...	...	17	238	120	960	200	400	337	1,598
Total ...	44	3,276	441	18,766	1,010	18,210	1,400	9,650	2,895	49,902

Reproduction.—Mean co-efficient of completeness, 0·7. Most of the blanks are completely stocked with chír saplings.

Accessibility.—Rather nearer and more accessible than compartment 7.

Ránikhet Reserve I. 9.

Boundaries.—North and west, compartment 10; east, block IV. 5 and 7; south, compartment 8.

Area.—50 acres, of which 3 unproductive.

Configuration and aspect.—Basin of Tangára gád, running east into the Káli ráo. Ruling gradients 20° to 30°.

Elevation.—Maximum 5,750 feet, minimum 5,400 feet, mean 5,580 feet.

Soil and underlying rock.—Rather better soil than that in compartment 1, resting on mica schists, but partly also on a soft crumbling quartzose sandstone.

Stock.—Resembles that in compartment 8, but with more broad-leaved trees and a smaller proportion of poles.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood
Chír	19	1,425	283	12,735	650	13,000	890	7,120	1,842	34,280
Caka	2	144	15	315	30	270	40	120	87	849
Miscellaneous ...	...	...	5	70	70	560	130	260	205	890
Total ...	21	1,569	303	13,120	750	13,830	1,060	7,500	2,134	36,019

Reproduction.—As in compartment 8, but less advanced.

Accessibility.—Nearer and more accessible than compartment 8.

Ranikhet Reserve I. 10.

Boundaries.—North compartment 14; east, compartment 14 and block IV. 5; south, compartments 9, 8, and 6; west, compartment 11.

Area.—61 acres, of which 4 unproductive.

Configuration and aspect.—Northerly, north westerly, and north-easterly slopes of 20° to 30°, drained into the Chhaqua gád.

Elevation.—Maximum 5,874 feet, minimum 5,350, mean 5,610 feet.

Soil and underlying rock.—As in compartment 9.

Stock.—Chír pole forest, with good belts of broad-leaved trees at the top and along the ravines and foot of the slopes. Mean density 0·6, quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	11	825	333	14,985	580	11,600	790	6,320	1,714	33,730
Oaks	6	432	44	924	70	630	90	270	210	2,256
Miscellaneous	...	...	18	252	140	1,120	230	460	388	1,832
Total ...	17	1,257	395	16,161	790	13,350	1,110	7,050	2,312	37,818

Reproduction.—Co-efficient of completeness, 0·7 ; nearly uniformly chír.

Accessibility.—1¼ mile from cart-road, whence a little more than a mile from Commissariat fuel depot.

Ránikhet Reserve I. 11.

Boundaries.—North, compartments 12 and 14 ; east, compartment 10 ; south, compartments 6 and 5 ; west, compartment 3 and outer boundary of forest (military prison site).

Area.—101 acres, of which 5 unproductive.

Configuration and aspect.—A succession of northerly and easterly slopes of 20° to 30° drained into the Chaunua gád.

Elevation.—Maximum 5,874 feet, minimum 5,520 feet, mean 5,680 feet.

Soil and underlying rock.—Much as in compartment 9.

Stock.—Young pole forest of chír, with fairly dense belts of oak and other broad-leaved trees along the ravines and foot of the slopes. Mean density 0·5, quality 0·7.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	45	3,375	607	27,315	1,180	23,600	1,590	12,720	3,422	67,010
Oaks	19	1,368	69	1,449	140	1,260	180	540	408	4,617
Miscellaneous	1	30	21	294	150	1,200	240	480	412	2,004
Total ...	65	4,773	697	29,058	1,470	26,060	2,010	13,740	4,242	73,631

Reproduction.—Co-efficient of completeness, 0·6. Chír saplings abundant; young oak also fairly numerous in the broad-leaved belts.

Accessibility.—¾ mile from cart-road, whence 1¼ mile to Commissariat fuel depôt.

Ranikhet Reserve I. 12.

Boundaries.—North and east, compartments 13 and 14; south, compartment 11 and outer boundary of forest (military prison site); west, outer boundary of forest (cart-road with Padholi 5 and 6 on other side).

Area.—89 acres, of which 4 unproductive.

Configuration and aspect.—The compartment lies across a flat spur running down east and wedged in between the two main branches of the Channua gád. Southerly slopes predominate. Ruling gradients 15° to 25°.

Elevation.—Maximum 5,850 feet, minimum 5,500 feet, mean 5,700 feet.

Soil and underlying rock.—Much as in compartment 1.

Stock.—Young pole forest of chír, with oaks principally fringing the slopes above the water-courses. Mean density 0·4, quality 0·7.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth...class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	50	3,750	108	4,860	730	14,600	990	7,920	1,878	31,130
Oaks	4	288	25	525	60	540	80	240	169	1,593
Miscellaneous	..	...	3	42	40	320	70	140	113	502
Total ...	54	4,038	136	5,427	830	15,460	1,140	8,300	2,160	33,225

Reproduction.—Mean co-efficient of completeness, 0·7. Established seedlings of chír everywhere; scattered young coppice of oak in broad-leaved forest.

Accessibility.—On cart-road 1½ mile from Commissariat fuel depôt.

Ranikhet Reserve I. 13.

Boundaries.—North and west, Almora cart-road with Padholi 6, 7, and 12 on other side; east, compartments 15 and 14; south, compartment 12.

Area.—77 acres, of which 3 unproductive.

Configuration and aspect.—Principally easterly and southerly slopes of 15° to 25°, running down to the Chhannua gád.

Elevation.—Maximum 5,750 feet, minimum 5,500 feet, mean 5,620 feet.

Soil and underlying rock.—Much as in compartment 1.

Stock.—Principally open middle-aged chír pole forest, surmounting fairly dense patches of saplings and small poles. Mean density 0·4, quality 0·6.

Sumamry of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	22	1,650	322	14,490	480	9,600	660	5,280	1,484	31,020
Oaks	...	...	7	147	20	180	30	90	57	417
Miscellaneous	...	...	1	14	10	80	30	60	41	154
Total ...	22	1,650	330	14,651	510	9,860	720	5,430	1,582	31,591

Reproduction.—Mean co-efficient of completeness, 0·7.

Accessibility.—On cart-road 2½ miles on an average from Commissariat fuel depot.

Ranikhet Reserve I. 14.

Boundaries.—North and east, compartment 15 ; south, compartments 10 and 11; west, compartments 12 and 13.

Area.—62 acres, of which 2 unproductive.

Configuration and aspect.—The compartment occupies all three sides (westerly, southerly, and north-easterly) of a pyramidal hill, with a narrow stretch of south-westerly slopes opposite the north-easterly face. Ruling gradients 15° to 30°.

Elevation.—Maximum 5,700 feet, minimum 5,400 feet, mean 5,510 feet.

Soil and underlying rock.—Much as in compartment 9.

Stock.—Middle-aged chír forest as in compartment 13, but denser.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	28	2,100	459	20,655	520	10,400	700	5,600	1,707	38,755
Oaks	2	144	31	651	40	360	60	180	133	1,335
Miscellaneous	...	...	14	196	60	480	100	200	174	876
Total ...	30	2,244	504	21,502	620	11,240	860	5,980	2,014	40,966

Reproduction.—Mean co-efficient of completeness, 0·6 ; principally established seedlings.

Accessibility.—Half a mile from cart-road, whence 2¾ miles to Commissariat fuel depôt.

Ranikhet Reserve I. 15.

Boundaries.—North and east, outer boundary of forest (Upat) and IV. 3 and 5 south and west, compartment 14 ; west and north, compartment 13.

Area.—45 acres, of which 3 unproductive.

Configuration and aspect.—Principally north-easterly slopes of 15° to 30°.

Elevation.—Maximum 5,700 feet, minimum 5,400 feet, mean 5,550 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—As in compartment 14, but with a continuous band of bánj and other broad-leaved forest running along the foot of the slopes. Mean density 0·6, quality 0·7.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	14	1,050	309	13,905	380	7,600	500	4,000	1,203	26,555
Oaks ..	12	864	46	966	60	540	80	240	198	2,610
Miscellaneous	...	...	15	210	80	640	130	260	225	1,110
Total ...	26	1,914	370	15,081	520	8,780	710	4,500	1,626	30,275

Reproduction.—Mean co-efficient of completeness 0·6 ; principally established chír seedlings. A few coppice clumps of bánj.

Accessibility.—Half a mile of coolie carriage to cart-road, whence 3 miles to Commissariat fuel depot.

SECTION II.—RANIKHET RESERVE, BLOCK II.

Boundaries.—North, blocks I and IV, with the Káli gád between ; east and south, block III, with the Kála Jhippa between ; west, the Ayatána gád separating it from the Ránikhet cantonment.

Area.—930 acres, of which 27 unproductive.

Configuration and aspect.—Ground appreciably steeper and more hilly and rugged than in block I. Aspects mainly northerly.

Elevation.—Maximum 6,758 feet, minimum 4,920 feet, mean 5,500 feet.

Soil and underlying rock.—At southern extremity gneissic rocks crop up and yield a richer soil than the mica schists and better suited for oak and other broad-leaved trees ; elsewhere as in block I.

Stock.—Principally upper broad-leaved forest in the higher portions and in ravines and glens ; elsewhere chír of more open growth than in block I. There are many patches of good reproduction, which require being given more light in the jardinage fellings.

The quantity of standing stock above 18 inches in girth is given in the annexed statement :—

Species.	Diameter-class.	Compartment 1, area 113 acres.		Compartment 2, area 108 acres.		Compartment 3, area 157 acres.		Compartment 4, area 75 acres.		Compartment 5, area 70 acres.		Compartment 6, area 96 acres.		Compartment 7, area 100 acres.		Compartment 8, area 45 acres.		Compartment 9, area 166 acres.		Entire block, area 930 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír ...	I.	60	0·53	80	0·74	125	0·80	26	0·35	45	0·64	52	0·54	25	0·25	27	0·60	63	0·38	503	0·54
	II.	617	5·46	759	7·02	1,574	10·02	444	5·92	585	8·35	973	10·13	808	8·08	726	16·13	699	4·21	7,185	7·72
	III.	525	4·64	530	4·90	1,845	11·75	385	5·13	770	11·00	1,250	13·02	1,230	12·30	810	18·00	755	4·57	8,100	8·71
	IV.	674	5·96	677	6·27	2,370	15·10	477	5·36	981	14·01	1,614	16·81	1,530	15·30	1,008	22·40	969	5·82	10,300	11·07
Total ...	...	1,876	16·59	2,046	18·94	5,914	37·67	1,332	17·76	2,381	34·01	3,889	40·51	3,593	35·93	2,571	57·13	2,486	14·98	26,088	28·05
Oaks ...	I.	114	1·01	51	0·47	70	0·45	49	0·65	35	0·50	21	0·22	37	0·37	11	0·24	24	0·14	412	0·44
	II.	280	2·47	177	1·63	197	1·25	106	1·41	126	1·80	72	0·75	108	1·08	47	1·04	57	0·34	1,170	1·26
	III.	392	3·46	246	2·28	314	2·00	188	2·50	212	3·03	166	1·73	178	1·78	88	1·96	66	0·40	1,850	1·99
	IV.	582	5·13	370	3·43	470	2·99	280	3·74	325	4·64	246	2·56	269	2·69	157	3·49	101	0·61	2,800	3·01
Total ...	...	1,368	12·15	844	7·81	1,051	6·69	623	8·30	698	9·97	505	5·26	592	5·92	303	6·74	248	1·49	6,232	6·70
Miscellaneous ...	I.	47	0·41	3	0·02	18	0·11	11	0·14	5	0·07	3	0·03	5	0·05	3	0·07	...	...	95	0·10
	II.	130	1·15	64	0·59	68	0·43	64	0·85	21	0·30	31	0·32	58	0·58	5	0·11	4	0·02	445	0·47
	III.	236	2·08	207	1·91	266	1·69	148	1·97	148	2·11	118	1·23	177	1·77	30	0·67	30	0·18	1,360	1·46
	IV.	358	3·16	335	3·10	415	2·64	232	3·09	246	3·51	198	2·06	276	2·76	52	1·15	48	0·29	2,160	2·32
Total ...	...	771	6·80	609	5·62	767	4·88	455	6·07	420	6·00	350	3·64	516	5·16	90	2·00	82	0·49	4,060	4·36
Grand Total ...	...	4,015	35·54	3,499	32·39	7,732	49·24	2,410	32·12	3,499	49·99	4,744	49·42	4,701	47·01	2,964	65·87	2,816	16·96	36,880	39·11

Ránikhet Reserve II. 1.

Boundaries.—North, compartment 2; east, compartment 4 and III. 2 and 13; south, compartment 13; west, outer boundary of forest (Cantonment).

Areas.—113 acres, of which 6 unproductive.

Configuration and aspect.—Westerly and north-westerly slopes of 20° to 30,° drained directly into the Ayatúna gád.

Elevation.—Maximum 6,758 feet, minimum 5,700 feet, mean 6,300 feet.

Soil and underlying rock.—A dry sandy soil, overlying a gneissose schistose rock or a soft quartzite; excellent for mixed chír and bánj.

Stock.—The upper broad-leaved type is pretty largely represented here and extends into the chír type, with which it forms a promising mixed growth, and which is only confined to the crests of the lower ridges and spurs. *Quercus dilatata* just puts in an appearance on the main ridge. Mean density 0·6, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood	Number of trees.	Maunds of wood.
Chír	60	4,500	617	27,705	525	10,500	674	5,392	1,876	48,157
Oaks	114	8,208	280	5,880	392	3,528	582	1,746	1,368	49,362
Miscellaneous	47	1,410	130	1,820	236	1,888	358	716	771	5,834
Total ...	221	14,118	1,027	35,465	1,153	15,916	1,614	7,854	4,015	63,353

Reproduction.—Mean co-efficient of completeness, 0·6; both chír and oak.

Accessibility.—Coolie carriage for 1½ miles to Chaubattia depôt and 3 miles to Ránikhet depôt.

Ránikhet Reserve II. 2.

Boundaries.—North and west, outer boundary of forest (Cantonment); east, compartment 3; south, compartments 4 and 1.

Area.—108 acres, of which 6 unproductive.

Configuration and aspect.—The compartment sits astride the Událiána spur, of which one face looks west, the other north-east. Ruling gradients 20° to 30°.

Elevation.—Maximum 6,230 feet, minimum 5,500 feet, mean 5,850 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Similar to that in compartment 1, except that the chír type is more largely represented, the upper broad-leaved one becoming slightly more restricted, and that the density is still lower.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	80	6,000	759	34,155	530	10,600	677	5,416	2,046	56,171
Oaks	51	3,672	177	3,717	246	2,214	370	1,110	844	10,713
Miscellaneous	3	90	64	896	207	1,656	335	670	609	3,312
Total ...	134	9,762	1,000	38,768	983	14,470	1,382	7,196	3,499	70,196

Reproduction.—Mean co-efficient of completeness, 0·5; numerous patches of established chír seedlings.

Accessibility.—Coolie carriage for 1½ mile to Chaubattia depôt and just under 3 to Ránikhet.

Ránikhet Reserve II. 3.

Boundaries.—North, block I. 6 and 7; south and east, block I. 8 and compartments 5 and 6; south, compartment 4; west, compartment 2 and outer boundary of forest (Cantonment).

Area.—157 acres, of which 6 unproductive.

Configuration and aspect.—The compartment lies across the Lámi spur, which, after running down for half its length north, suddenly sweeps round to the north-west and throws off a number of offshoots. The aspects are mainly northerly and north easterly, only the smallest face of the main spur looking west. Ruling gradients 15° to 30°.

Elevation.—Maximum 6,300 feet, minimum 5,280 feet, mean 5,680 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Chír pole forest on the spurs and more exposed slopes; in the ravines upper broad-leaved forest. Mean density 0·5, quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	125	9,375	1,574	70,830	1,645	36,900	2,370	18,960	5,914	136,065
Oaks	70	5,040	197	4,137	314	2,826	470	1,410	1,051	13,413
Miscellaneous	18	540	68	952	266	2,128	415	830	767	4,450
Total ...	213	14,955	1,839	75,919	2,425	41,854	3,255	21,200	7,732	153,928

Reproduction.—Co-efficient of completeness, 0·6; established chír seedlings numerous, oak making a very fair start.

Accessibility.—Coolie carriage for 3 miles to Chaubattia and 3½ miles to Ránikhet depôt.

Ránikhet Reserve II. 4.

Boundaries.—North, compartments 2, 3, 6, and 7; east and south, compartment 8 and block III. 1 and 2; west, compartment 1.

Area.—75 acres, of which 5 unproductive.

Configuration and aspect.—Mainly north-easterly and easterly slopes of 15° to 25°, comprising the headwaters of the Budkira and Chíri gáds.

Elevation.—Maximum 6,600 feet, minimum 6,100 feet, mean 6,300 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Area equally divided between chír and upper broad-leaved types: the latter at the top of the compartment and in the ravines and valleys and cool northerly slopes; chír forest very open. Mean density 0·4, quality 0·4.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	26	1,950	444	19,980	385	7,700	477	3,816	1,332	33,446
Oaks	49	3,528	106	2,226	188	1,692	280	840	623	8,286
Miscellaneous	11	330	64	896	148	1,184	232	464	455	2,874
Total ...	86	5,808	614	23,102	721	10,576	989	5,120	2,410	44,606

Reproduction.—Mean co-efficient of completeness in chír forest, 0·4; in oak forest 0·2. Established chír fairly abundant in patches.

Accessibility.—Coolie carriage for just over a mile to Chaubattia depôt and 3½ miles to Ránikhet depôt.

Ránikhet Reserve II. 5.

Boundaries.—North and west, block IV. 9 and 8, and compartment 3; east and south, compartment 6.

Area.—70 acres, of which 4 unproductive.

Configuration and aspect.—Northerly and westerly slopes of 20° to 30°, drained directly into the Káli gád.

Elevation.—Maximum 6,100 feet, minimum 5,250 feet, mean 5,480 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Very much as in compartment 3, but with a wider distribution of the broad-leaved type owing to the narrowness of the slopes and the consequent depth of the gullies and ravines.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood	Number of trees.	Maunds of wood.
Chír	45	3,375	585	26,325	770	15,400	981	7,848	2,381	52,948
Oaks	35	2,520	126	2,646	212	1,908	325	975	698	8,049
Miscellaneous	5	150	21	294	148	1,184	246	492	420	2,120
Total ...	85	6,045	732	29,265	1,130	18,492	1,552	9,315	3,499	63,117

Reproduction.—Mean co-efficient of completeness, 0·3. New chír coming on fairly well; oak very backward.

Accessibility.—Same distance as compartment 3 from Chaubattia depôt, but about half a mile farther than that compartment from Ránikhet depôt.

Ránikhet Reserve II. 6.

Boundaries.—North and west, compartment 5; east-block IV. 9 and 10; east and south, compartments 9 and 7; south, compartment 4, west, compartment 2.

Area.—96 acres, of which 5 unproductive.

Configuration and aspect.—Principally easterly and northerly slopes of 20° to 35°, drained directly, and through the Tari gád, into the Káli gád.

Elevation.—Maximum 6,300 feet, minimum 5,200 feet, mean 5,500 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally young pole forest of chír outside the ravines, and scrubby, but often dense, growth of broad-leaved species inside. Mean density 0·4, quality 0·5.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	52	3,900	973	43,785	1,250	25,000	1,614	12,912	3,889	85,597
Oaks	21	1,512	72	1,512	166	1,494	246	738	505	5,256
Miscellaneous	3	90	31	434	118	944	198	396	350	1,864
Total ..	76	5,502	1,076	45,731	1,534	27,438	2,058	14,046	4,744	92,717

Reproduction.—Mean co-efficient of completeness, 0·4. Oak very backward, but making a beginning; many large patches of established chír seedlings; recent seedlings not numerous.

Accessibility.—Same distance as compartment 5 from Chaubattia depôt, but a quarter mile farther from Ránikhet depôt.

Ranikhet Reserve II. 7.

Boundaries.—North and west, compartment 6; east compartment 9; south, compartments 8 and 4.

Area.—100 acres, of which 4 unproductive.

Configuration and aspect.—Northerly and north-easterly, rather broken slopes of 20° to 35°, comprising the headwaters of an important feeder of the Káli gád.

Elevation.—Maximum 6,280 feet, minimum 5,280 feet, mean 5,750 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Similar to that in preceding compartment, but with a slightly larger proportion of the broad-leaved type.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	25	1,875	808	36,360	1,230	24,600	1,530	12,240	3,593	75,075
Oaks	37	2,664	108	2,268	178	1,602	269	807	592	7,341
Miscellaneous	5	150	58	812	177	1,416	276	552	516	2,930
Total ...	67	4,689	974	39,440	1,585	27,618	2,075	13,599	4,701	85,346

Reproduction.—Rather worse than in preceding compartment.

Accessibility.—2½ miles from Chaubattia depôt, 4 miles from Ránikhet depôt, all coolie carriage.

Ránikhet Reserve II. 8.

Boundaries.—North and west, compartments 9 and 7 ; east compartment 9 ; east and south, block III. 6 and 1 ; west, compartment 4.

Area.—45 acres, of which 2 unproductive.

Configuration and aspect.—Rugged easterly slopes of 20° to 40°, overhanging the Kála Jhippa stream.

Elevation.—Maximum 6,000 feet, minimum 4,900 feet, mean 5,350 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally middle-aged chír pole forest, with a fringe of broad-leaved species along the Kála Jhippa. Mean density 0·5, quality 0·6.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	27	2,025	726	32,670	810	16,200	1,008	8,064	2,571	58,959
Oaks	11	792	47	987	88	792	157	471	303	3,042
Miscellaneous	3	90	5	70	30	240	52	104	90	504
Total ...	41	2,907	778	33,727	928	17,232	1,217	8,639	2,964	62,505

Reproduction.—Mean co-efficient of completeness, 0·6 ; mainly pine seedlings and saplings.

Accessibility.—2¾ miles from Chaubattia Commissariat fuel depôt ; from that at Ránikhet 5 miles.

Ránikhet Reserve II. 9.

Boundaries.—North, block IV. 10 and compartment 6 ; east, block IV. 13 ; south and east, compartment 8 ; west, compartment 7.

Area.—166 acres, of which 8 unproductive.

Configuration and aspect.—The compartment stretches on both sides of the great Khaniári ridge, but extends right down to the main drainage channel only on the north side. Hence, as the ridge runs north-east, northerly aspects easily predominate, easterly and, to a much slighter extent, south-easterly aspects coming next. Ruling gradients 15° to 25°.

Elevation.—Maximum 5,600 feet, minimum 4,920 feet, mean 5,300 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—The west of the ridge and upper slopes are old fields, and are now blank or contain very young plantations. Over the rest of the area (about ⅓rd) there is principally middle-aged chír pole forest, with a broad-leaved fringe at the bottom and in the lower and deeper ravines. Mean density 0 3, quality 0 4.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	63	4,725	699	31,455	755	15,100	969	7,752	2,486	59,032
Oaks	24	1,728	57	1,197	66	594	101	303	248	3,822
Miscellaneous	...	..	4	56	30	240	48	96	82	392
Total ...	87	6,153	760	32,708	851	15,934	1,118	8,151	2,816	63,246

Reproduction.—Mean co-efficient of completeness outside plantations 0·7 ; principally chír seedlings, most of them already established.

Accessibility.—3½ miles from Chaubattia fuel depôt, 4½ miles from that at Ránikhet.

SECTION III.—RÁNIKHET RESERVE, BLOCK III.

Boundaries.—North and east, block IV. with the Káli gád between ; east, the Ulubága river, separating it from village lands ; south, the Ujani and Garsing gáds, separating it respectively from village lands and Cháubattia protected forest east and from the cantonment ; west, cantonment ; west and north, block II., with the Kála Jhippa between.

Area.—1,108 acres, of which 49 unproductive.

Configuration and aspect.—The block lies across the great Jákhdeo ridge, the southern slopes, about a fifth of the total area, being steep, while the northern slopes, which are slightly exposed to the east, are longer and more gentle.

Elevation.—Maximum 6,800 feet, minimum 4,750 feet, mean 5,400 feet.

Soil.—The gneissic element is more largely represented than in block II., but the lower elevation and more exposed aspect favours chír.

Stock.—There are numerous large blanks, the sites of abandoned cultivation. Upper broad-leaved forest predominates on the higher slopes near the Ágáspur ridge ; elsewhere as in the lower portion of block II.

The enumeration survey results are given as follow :—

Species.	Diameter-class.	Compartment 8, area 152 acres.		Compartment 7, area 89 acres.		Compartment 6, area 134 acres.		Compartment 5, area 74 acres.		Compartment 4, area 65 acres.		Compartment 3, area 31 acres.		Compartment 2, area 61 acres.		Compartment 1, area 75 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chir	I.	31	0·41	7	0·11		...	18	0·27	11	0·14	128	0·95	86	0·97	24	0·16
	II.	533	7·11	280	4·59	101	3·25	240	3·69	131	1·77	844	6·30	512	5·75	604	3·97
	III.	590	7·87	800	4·91	120	3·87	270	4·15	340	4·59	1,020	7·61	900	10·11	1,000	6·58
	IV.	740	9·37	370	6·06	150	4·84	340	5·23	420	5·67	1,250	9·33	1,100	12·36	1,220	8·02
Total	...	1,894	25·25	957	15·67	371	11·96	868	13·34	902	12·18	3,242	24·19	2,598	29·19	2,848	18·73
Oaks	I	56	0·75	41	0·67	40	1·29	10	0·15	3	0·04	18	0·13	6	0·06	2	0·03
	II.	183	2·44	130	2·13	91	2·93	55	0·84	5	0·06	124	0·92	48	0·54	18	0·11
	III.	210	2·80	145	2·37	110	3·55	70	1·08	20	0·26	150	1·11	80	0·89	30	0·19
	IV.	290	3·87	200	3·27	160	5·16	110	1·69	40	0·54	240	1·79	130	1·46	60	0·39
Total	...	739	9·85	516	8·44	401	12·93	245	3·76	68	0·91	532	3·95	264	2·96	110	0·72
Miscellaneous	I.	8	0·17	8	0·13	6	0·19	1	0·01	...	...	...	...	3	0·03	...	...
	II.	188	2·51	155	2·54	156	5·03	68	1·04	8	0·10	117	0·87	33	0·37	5	0·03
	III.	610	8·13	520	8·52	430	13·87	240	3·69	40	0·54	40[illegible]	2·99	180	2·02	100	0·65
	IV.	1,030	13·73	890	14·59	700	22·58	470	7·23	80	1·08	76[illegible]	5·67	340	3·82	190	1·25
Total	...	1,836	24·48	1,573	25·78	1,292	41·67	779	11·98	128	1·72	1,277	9·53	556	6·24	295	1·94
Grand Total	...	4,469	59·59	3,046	49·89	2,064	66·56	1,892	29·10	1,098	14·83	5,051	37·69	3,418	38·40	3,253	21·4

Species	Diameter-class.	Compartment 9, area 110 acres.		Compartment 10, area 23 acres.		Compartment 11, area 39 acres.		Compartment 12, area 72 acres.		Compartment 13, area 45 acres.		Compartment 14, area 41 acres.		Compartment 15, area 97 acres.		Entire block, area 1,108 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chir	I.	...	...	...	...	6	0·15	15	0·20	1	0·02	...	...	1	0·01	328	
	II.	271	2·46	116	5·04	156	4·00	260	3·61	157	3·49	8	0·19	320	3·30	4,533	
	III.	450	4·09	250	10·87	200	5·13	300	4·17	190	4·42	10	0·24	360	3·71	6,300	
	IV.	560	5·06	310	13·48	250	0·41	380	5·28	240	5·33	20	0·49	450	4·64	7,800	
Total	...	1,281	11·64	676	29·39	612	15·69	955	13·26	588	13·06	38	0·92	1,131	11·65	18,961	
Oaks	I.	...	...	...	...	1	0·03	16	0·22	27	0·60	2	0·05	112	1·15	334	
	II.	...	...	...	...	18	0·46	114	1·58	125	2·78	49	1·19	409	4·22	1,369	
	III.	5	0·04	10	0·43	40	1·03	130	1·80	150	3·33	60	1·46	440	4·54	1,650	
	IV.	10	0·09	20	0·87	70	1·79	190	2·64	230	5·11	100	2·44	610	6·29	2,460	
Total	...	15	0·13	30	1·30	129	3·31	450	6·25	532	11·82	211	5·14	1,571	16·20	5,813	
Miscellaneous	I.	...	...	...	...	...	...	...	...	...	...	...	...	8	0·08	34	
	II.	2	0·01	9	0·39	22	0·56	106	1·47	123	2·72	39	0·95	340	3·51	1,371	
	III.	10	0·09	30	1·30	100	0·57	310	4·30	280	6·22	140	3·41	820	8·45	4,210	
	IV.	20	0·18	50	2·17	160	4·10	500	6·94	450	10·00	220	5·36	1,300	13·40	7,160	
Total	...	32	0·29	89	3·87	282	7·23	916	12·72	853	18·94	399	9·73	2,468	25·44	12,775	
Grand Total ...	...	1,328	12·07	795	34·56	1,023	26·23	2,321	32·23	1,913	43·82	648	15·80	5,170	53·30	37,549	

Ranikhet Reserve III. 1.

Boundaries.—North and west, block II. 8; east, compartment 6; south, compartments 4, 3, and 2.

Area.—75 acres of which 3 unproductive.

Configuration and aspect.—Alternate northerly and easterly slopes of 15°—25° drained directly into the Kála Jhippa.

Elevation.—Maximum 5,620 feet; minimum 4,930 feet; mean 5,270 feet.

Soil and underlying rock.—A free sandy soil, overlying gneissose rocks with here and there an outcrop of soft yellow quartzite; excellent for forest growth under broad leaved trees.

Stock.—Equally distributed between the chír and upper broad-leaved types and their combination. Mean density 0·6; quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	31	2,325	533	23,985	590	11,800	740	5,920	1,894	44,030
Oaks ...	56	4,032	183	3,843	210	1,890	290	870	739	10,635
Miscellaneous,	8	240	188	2,632	610	4,880	1,030	2,060	1,836	9,812
Total ...	95	6,597	904	30,460	1,410	18,570	2,060	8,850	4,469	64,477

Reproduction.—Mean co-efficient of completeness 0·7, principally both established and non-established chír, only a little oak.

Accessibility.—2¼ miles coolie carriage to Chaubattia depôt, 4 miles to Ranikhet depôt.

Ranikhet Reserve III. 2.

Boundaries.—North, compartment 1; east, compartment 3; south, compartments, 12 and 13; west, block II., 1 and 4.

Area.—61 acres, of which 3 unproductive.

Configuration and aspect.—Northerly and north-easterly slopes of 20°—30°, comprising the head-waters of the Kála Jhippa.

Elevation.—Maximum 6,500 feet; minimum 5,500 feet; mean 5,960 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally owing to the elevation and confined slopes upper broad-leaved forest, with chír on the spurs and in mixture here and there. Mean density 0·4; quality 0·5. Heavily cut once before.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	7	525	280	12,600	300	6,000	370	2,960	957	22,085
Oaks ...	41	2,952	130	2,730	145	1,305	200	600	516	7,587
Miscellaneous,	8	240	155	2,170	520	4,160	890	1,780	1,573	8,350
Total ...	56	3,717	565	17,500	965	11,465	1,460	5,340	3,046	38,022

Reproduction.—Mean co-efficient of completeness 0·5.

Accessibility.—2 miles to Chaubattia, 4 to Ránikhet depôt, all coolie carriage.

Ranikhet Reserve III. 3.

Boundaries.—North, compartment 1; east, compartments 4, 11, and 12; south, compartment 12; west, compartment 2.

Area.—31 acres, of which 2 unproductive.

Configuration and aspe t.—Northerly slopes of 15°—25,° comprising the head-waters of a long and much-branched feeder of the Kála Jhippa.

Elevation.—Maximum 6,300 feet; minimum 5,850 feet; mean 6,000 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Larger proportion of the broad-leaved type than even in compartment 2. Mean density 0·5; quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chir ...	...	...	101	4,545	120	2,400	150	1,200	371	8,145
Oaks ...	40	2,880	91	1,911	110	990	160	480	201	6,261
Miscellaneous,	6	180	156	2,184	430	3,440	700	1,400	1,292	7,204
Total ...	46	3,060	348	8,640	660	6,830	1,010	3,080	2,064	21,610

Reproduction.—Mean co-efficient of completeness 0·5; all species.

Accessibility.—2 miles from Chaubattia, 4¼ from Ránikhet depôt.

Ranikhet Reserve III. 4.

Boundaries.—North, compartment 1; east, compartments 6 and 5; south, compartment 11; west, compartment 3.

Area—65 acres, of which 3 unproductive.

Configuration and aspect.—Principally northerly open rounded slopes of 15°—25°, coming down from the main ridge.

Elevation.—Maximum 6,178 feet; minimum 5,850 feet; mean 5,980 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Here the two types are about equally represented. Mean density 0·3; quality 0·5.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chir ...	18	1,350	240	10,800	270	5,400	341	2,720	868	20,270
Oaks ...	10	720	55	1,155	70	630	110	330	245	2,835
Miscellaneous,	1	30	68	952	240	1,920	470	940	779	3,842
Total ...	29	2,100	363	12,907	580	7,950	921	3,990	1,892	26,947

Reproduction.—Mean co-efficient of completeness 0·4; promising only in patches.

Accessibility.—2¼ miles from Chaubattia, 4½ from Ranikhet depôt.

Ranikhet Reserve III., 5.

Boundaries.—North, compartments 4, 6, 7, and 8 ; east, compartment 8 ; south, compartments 9, 10, and 11 ; west, compartments 11 and 4.

Area.—74 acres, of which 2 unproductive.

Configuration and aspect.—The crest and upper slopes of the Jákh Deo ridge, which runs west and east. Ruling gradients 0°—15°.

Elevation.—Maximum 5,868 feet; minimum 5,630 feet; mean 5,700 feet.

Soil and underlying rock.—A rich, deep soil, being abandoned site of extensive cultivation. Underlying rock gneissic.

Stock.—Only about 16 acres under forest, mainly chír ; mean density 0·6 ; quality 0·6. The rest of the area comprises the Jakh Deo plantation.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	11	825	131	5,895	340	6,800	420	3,360	902	16,880
Oaks ...	3	216	5	105	20	180	40	120	68	621
Miscellaneous,	...	...	8	112	40	320	80	160	128	592
Total ...	14	1,041	144	6,112	400	7,300	540	3,640	1,098	18,093

Reproduction.—Mean co-efficient of completeness 0·6 ; inside plantation 0·6, principally eucalyptus, chestnut, horse chestnuts and Australian wattles.

Accessibility.—2¾ miles from Chaubattia, 5 miles from Ránikhet depôt.

Ranikhet Reserve III. 6.

Boundaries.—North, block II., 9, and block IV., 13 and 14 ; east and south, compartment 7 : south, compartment 5 ; west, compartments 4 and 1.

Area.—134 acres, of which 6 unproductive.

Configuration and aspect.—Principally northerly slopes of 20°—30°, occupying the angle between the Kála Jhippa and Káligád.

Elevation.—Maximum 5,680 feet ; minimum 4,820 feet ; mean 5,150 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally young pole forest of chír with broad-leaved bands fringing the ravines and slopes immediately above the streams. Mean density 0·7 ; quality 0·8.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	128	9,600	844	37,980	1,020	20,400	1,250	10,000	3,242	77,980
Oaks ...	18	1,296	124	2,604	150	1,350	240	720	532	5,970
Miscellaneous,	...	...	117	1,638	400	3,200	760	1,520	1,277	6,358
Total ...	146	10,896	1,085	42,222	1,570	24,950	2,250	12,240	5,051	90,308

Reproduction.—Mean co-efficient of completeness 0·7. Very little room for new reproduction. A fair show of chír seedlings in the few blanks.

Accessibility.—3 miles from Chaubattia, 5 from Ránikhet depôt.

Ranikhet Reserve III. 7.

Boundaries.—North and west, compartment 6; east, block IV., 14, and compartment 8; south, compartment 5.

Area.—89 acres, of which 3 unproductive.

Configuration and aspect.—Principally northerly and north-easterly slopes of 20°—30° running down to the Káli gád.

Elevation.—Maximum 5,600 feet; minimum 4,780 feet; mean 5,150 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—As in compartment 6.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	86	6,450	512	23,040	900	18,000	1,100	8,800	2,598	56,290
Oaks ...	6	432	48	1,008	80	720	130	390	264	2,550
Miscellaneous,	3	90	33	462	180	1,440	340	680	556	2,672
Total ...	95	6,972	593	24,510	1,160	20,160	1,570	9,870	3,418	61,512

Reproduction.—As in compartment 6.

Accessibility.—2¾ miles from Chaubattia, 5½ from Ránikhet depôt.

Ranikhet Reserve III. 8.

Boundaries.—North, block IV., 11; east, block IV., 14, and compartment 9; south, compartment 9; west, compartments 5 and 7.

Area.—152 acres, of which 6 unproductive.

Configuration and aspect.—North-easterly slopes of 20°—30° running down to the Káli gád.

Elevation.—Maximum 5,500 feet; minimum 4,730 feet; mean 5,050 feet.

Soil and underlying rock.—Rather better than in compartment 1.

Stock.—Outside plantation as in compartment 7, but with less of the broad-leaved type.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	24	1,800	604	27,180	1,000	26,000	1,220	9,760	2,848	58,740
Oaks ...	2	144	18	378	30	270	60	180	110	972
Miscellaneous,	...	...	5	70	100	800	190	380	295	1,250
Total ...	26	1,944	627	27,628	1,130	21,070	1,470	10,320	3,253	60,962

Reproduction.—Mean co-efficient of completeness 0·4; principally young seedlings. Plantations not quite successful, but chír is filling up blanks in it.

Accessibility.—3¼ miles from Chaubattia, 6 from Ránikhet depôt.

Ránikhet Reserve III. 9.

Boundaries.—North, compartment 8, and block IV. 14; east, outer boundary of forest (village lands); south, outer boundary of forest (village lands), and, for a few yards, Chaubattia forest east, and cantonment; west, compartment 10.

Area.—110 acres, of which 6 unproductive.

Configuration and aspect.—Slopes of 15°—30,° sweeping round the extremity of the Jákhdeo ridge; two-thirds of the area look south, the rest north-east.

Elevation.—Maximum 5,600 feet; minimum 4,750 feet; mean 5,150 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—The north-easterly slopes are mostly bare, being old abandoned fields. Elsewhere principally pine pole forest. Mean density 0·5; quality 0·5.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	...	...	271	12,195	450	9,000	560	4,480	1,281	25,675
Oaks ...	...	...	...	...	5	45	10	30	15	75
Miscellaneous,	...	...	2	28	10	80	20	40	32	148
Total ...	...	...	273	12,223	465	9,125	590	4,550	1,328	25,898

Reproduction.—A few seedlings and saplings on the bare slopes beside the plantations. Elsewhere mean co-efficient of completeness 0·4, principally saplings and low poles.

Accessibility.—Chaubattia depôt 3, Ránikhet depôt 5½ miles.

Ranikhet Reserve III. 10.

Boundaries.—North, compartment 5; east, compartment 9; south, outer boundary of forest (cantonment); west, compartment 11.

Area.—23 acres, of which 2 unproductive.

Configuration and aspect.—Southerly slopes of 25°—35°, overhanging the Garsing gád.

Elevation.—Maximum 5,520 feet; minimum 5,250 feet; mean 5,390 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally young pole forest of chír, with a fringe of broad-leaved trees at the bottom. Mean density 0·5; quality 0·6.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood	Number of trees.	Maunds of wood.
Chír ...	...	...	116	5,220	250	5,000	310	2,480	676	12,700
Oaks ...	...	...	...	...	10	90	20	60	30	150
Miscellaneous,	...	...	9	126	30	240	50	100	89	466
Total ...	...	...	125	5,346	290	5,330	380	2,640	795	13,316

Reproduction.—Mean co-efficient of completeness 0·6. Large saplings and small poles of chír abundant.

Accessibility.—2½ miles from the Chaubattia, 5½ miles from the Ránikhet depôt.

Ránikhet Reserve III. 11.

Boundaries.—North, compartments 4 and 5; east, compartment 10; south, outer boundary of forest (cantonment); west and south, compartments 12 and 3.

Area.—39 acres, of which 3 unproductive.

Configuration and aspect.—A very irregular-shaped compartment; western half looks south-east, eastern, east, and south.

Elevation.—Maximum 6,178 feet; minimum 5,300 feet; mean 5,600 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Chír pole forest, with fringes of broad-leaved trees in the ravines and at the bottom. Mean density 0·5, quality 0·7.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	6	450	150	7,020	200	4,000	250	2,000	612	13,470
Oaks ...	1	72	18	378	40	360	70	210	129	1,020
Miscellaneous,	...	...	22	308	100	800	160	320	282	1,428
Total ...	7	522	190	7,706	340	5,160	480	2,530	1,023	15,918

Reproduction.—Mean co-efficient of completeness 0·6; principally seedlings and saplings of chír.

Accessibility.—2 miles from the Chaubattia, 5 miles from the Ránikhet depôt.

Ranikhet Reserve III. 12.

Boundaries.—North, compartments 3 and 4; north and west, compartment 11; south, outer boundary of forest (cantonment); south and west, compartments 15 and 13.

Area.—72 acres, of which 4 unproductive.

Configuration and aspect.—Southerly and easterly slopes of 20°—30,° with zigzag contours and drained partly into the Garsing gád and partly into its feeder, the Agáspur-gád.

Elevation.—Maximum 6,350 feet; minimum 5,800 feet; mean 6,100 feet.

Soil and underlying rock.—As in compartment 1, but more of the quartzose rock.

Stock.—Owing to some of the slopes being above 6,000 feet, the broad-leaved type is very much better represented here than in the preceding compartment, chir being found principally on the spurs. Mean density 0·5; quality 0·6.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	15	1,125	260	11,700	300	6,000	380	3,040	955	21,865
Oaks ...	16	1,152	114	2,394	130	1,170	190	570	450	5,286
Miscellaneous,	...	...	106	1,484	310	2,480	500	1,000	916	4,964
Total ...	31	2,277	480	15,578	740	9,650	1,070	4,610	2,321	32,115

Reproduction.—Mean co-efficient of completeness 0·4 ; principally saplings.

Accessibility.—1¾ miles from the Chaubattia, 5 from the Ránikhet depôt.

Ranikhet Reserve III. 13.

Boundaries.—North, compartment 2 ; east, compartment 12; south, compartments 15 and 14 ; west block II. 1.

Area.—45 acres, of which 3 unproductive.

Configuration and aspect.—Northerly slopes of 20°—30° coming down from the Agáspur ridge to the Gád of the same name.

Elevation.—Maximum 6,800 feet ; minimum 5,950 feet ; mean 6,200 feet.

Configuration and aspect.—A free sandy soil, resting on a granitoid rock, and here and there on quartzites.

Stock.—Principally upper broad-leaved forest, with chír on some of the spurs at the lower elevations. Mean density 0 6 ; quality 0·7.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	1	75	157	7,165	190	3,800	240	1,920	588	12,860
Oaks ...	27	1,944	125	2,625	150	1,350	230	690	532	6,609
Miscellaneous,	...	...	123	1,722	280	2,240	450	900	853	4,862
Total ...	28	2,019	405	11,512	620	7,390	920	3,510	1,973	24,331

Reproduction.—Mean co-efficient of completeness 0·5 ; principally saplings and large seedlings of bánj.

Accessibility.—1¼ from the Chaubattia, 5 from the Ránikhet depôt.

Ranikhet Reserve III. 14.

Boundaries.—North, compartment 13 ; east and south, compartment 15 ; west, outer boundary of forest (cantonment).

Area.—41 acres, of which 2 unproductive.

Configuration and aspect.—North-easterly slopes of 20°—30° running down from the Garshima ridge to the Agáspur gád.

Elevation.—Maximum 6,756 feet ; minimum 6,100 feet ; mean 6,380 feet.

Soil and underlying rock.—As in compartment 13.

Stock.—Almost entirely upper broad-leaved forest, but most stems under 18 inches in girth. Mean density 0·8 ; quality 0·4.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	...	...	8	360	10	200	20	160	38	720
Oaks ...	2	144	49	1,029	60	540	100	300	211	2,013
Miscellaneous,	...	...	39	546	140	1,120	220	440	399	2,106
Total ...	2	144	96	1,935	210	1,860	340	900	648	4,839

Reproduction.—Mean co-efficient of completeness, 0·6.

Accessibility.—1 mile from the Chaubattia, 5 from the Ránikhet depôt.

Ránikhet Reserve III. 15.

Boundaries.—North, compartments 14, 13 and 12; east, south and west, outer boundary of forest (cantonment).

Area.—97 acres, of which 3 unproductive.

Configuration and aspect.—Principally southerly and westerly slopes, in the angle between the Garsing and Agáspur gáds. Ruling gradients 20°—35.°

Elevation.—Maximum 6,756 feet; minimum 5,800 feet; mean 6,300 feet.

Soil and underlying rock.—As in compartment 13.

Stock.—Principally upper broad-leaved forest, with a large sweep of chír on the more open slopes. Most of the bánj under 4th class girth. Mean density 0·7; quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	1	75	320	14,400	360	7,200	450	3,600	1,131	25,275
Oaks ...	112	8,064	409	8,589	440	3,960	610	1,830	1,571	22,443
Miscellaneous,	8	240	340	4,760	820	6,560	1,300	2,600	2,468	14,160
Total ...	121	8,379	1,069	27,749	1,620	17,720	2,360	8,030	5,170	61,878

Reproduction.—Mean co-efficient of completeness 0·6; excellent low poles of bánj.

Accessibility.—1¼ miles from the Chaubattia, 5½ from the Ránikhet depôt.

Section IV.—Ránikhet Reserve, Block IV.

Boundaries.—North, village lands and Dwársaon protected forest; east, village lands; south, blocks III. and II., separated from it by the Káli gád; west, block I., separated from it by the Káli Ráo, and the cantonment lands of Upat.

Area.—1,981 acres, of which 93 unproductive.

Configuration and aspect.—Similar to block I,

Elevation.—Maximum 6,193 feet; minimum 4,910 feet; mean 5,470 feet.

Soil and underlying rock.—As in block I.

Stock.—Principally chír forest, except at the northern extremity, where broad-leaved trees are very abundant. Here also numerous large blanks represent old cultivation sites. This block is the worst stocked of the four, and reproduction in it is also the most backward.

The number of trees of the various counted species and girth-classes is given in the following statement:—

Species.	Diameter class.	Compartment 1, area 98 acres.		Compartment 2, area 83 acres.		Compartment 3, area 58 acres.		Compartment 4, area 56 acres.		Compartment 5, area 94 acres.		Compartment 6, area 91 acres.		Compartment 7, area 81 acres.		Compartment 8, area 36 acres.		Compartment 9, area 103 acres.		Compartment 10, area 96 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	29	0·29	10	0·12	26	0·44	13	0·23	28	0·29	32	0·35	25	0·30	26	0·72	90	0·87	66	0·69
	II.	237	2·41	97	1·16	220	3·79	256	4·57	259	2·64	254	2·79	118	1·45	189	5·25	467	4·53	358	3·73
	III.	400	4·08	156	1·87	365	6·29	417	7·44	408	4·34	417	4·58	182	2·24	308	8·55	777	7·54	582	6·06
	IV.	540	5·51	210	2·51	490	8·44	580	10·35	580	6·17	580	6·37	260	3·21	410	11·38	1,050	10·19	810	8·44
Total	...	1,206	12·30	473	5·69	1,101	18·98	1,266	22·61	1,295	13·77	1,283	14·10	585	7·22	933	25·92	2,384	23·14	1,816	18·92
Oaks	I.	33	0·34	...	...	...	...	...	...	8	0·08	8	0·08	2	0·02	...	...	9	0·08	1	0·01
	II.	138	1·40	31	0·37	...	...	3	0·05	68	0·72	49	0·53	102	1·26	...	...	57	0·55	31	0·32
	III.	170	1·83	40	0·48	2	0·03	5	0·09	86	0·91	60	0·66	134	1·65	4	0·11	70	0·67	40	0·41
	IV.	200	2·04	60	0·72	70	1·20	40	0·71	90	0·95	70	1·77	160	1·98	50	1·39	80	0·77	50	0 52
Total	...	541	5·52	131	1·58	72	1·24	48	0·86	252	2·67	187	2·05	398	4·92	54	1·50	216	2·10	122	1·27
Miscellaneous	I.	1	0·01	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	II.	128	1·30	37	0·44	14	0·24	6	0·10	34	0·36	35	0·38	56	0·70	27	0·75	31	0·30	54	0·56
	III.	250	2·55	100	1·20	80	1·38	40	0·71	170	1·81	140	1·54	320	0·40	220	6·11	230	2·23	170	1·77
	IV.	440	4·49	180	2·17	150	2·58	80	1·43	310	3·30	240	2·63	590	7·28	380	10·55	420	4·08	290	3·02
Total	...	819	8·36	317	3·82	244	4·21	126	2·25	514	5·47	415	4·56	966	11·92	627	17·42	681	6·61	514	5·34
Grand Total ...	...	2,566	26·18	921	11·09	1,417	24·43	1,440	25·71	2,061	21·93	1,885	20·71	1,949	24·06	1,614	44·83	3,281	31·85	2,452	25·54

Species.	Diameter class.	Compartment 11, area 62 acres.		Compartment 12, area 55 acres.		Compartment 13, area 104 acres.		Compartment 14, area 145 acres.		Compartment 15, area 237 acres.		Compartment 16, area 123 acres		Compartment 17, area 192 acres.		Compartment 18, area 97 acres.		Compartment 19, area 170 acres.		Entire block, area 1,981 acres.	
		Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.	Gross number of trees.	Number of trees per acre.
Chír	I.	32	0·51	24	0·43	103	0·99	47	0·32	128	0·54	29	0·23	14	0·07	19	0·20	41	0·24	782	0·40
	II.	158	2·55	165	3·00	351	3·37	768	5·29	431	1·82	235	1·91	157	0·82	164	1·69	258	1·51	5,142	2·59
	III.	251	4·05	280	5·09	572	5·50	1,183	8·15	696	2·93	385	3·13	260	1·35	131	1·35	210	1·23	8,000	4·04
	IV.	340	5·48	380	6·90	780	7·50	1,610	11·10	950	4·00	520	4·23	350	1·82	170	1·76	290	1·71	10,900	5·50
Total ...	...	781	12·59	849	15·44	1,806	17·36	3,608	24·89	2,205	9·30	1,169	9·50	781	4·07	484	5·00	799	4·70	24,824	12·53
Oaks	I.	1	0·01	3	0·05	13	0·12	2	0·01	34	0·04	3	0·02	64	0·33	56	0·57	43	0·25	280	0·14
	II.	21	0·33	40	0·72	51	0·49	39	0·26	143	0·60	45	0·36	266	1·38	158	1·63	130	0·76	1,372	0·69
	III.	26	0·42	50	0·90	66	0·63	50	0·34	170	0·71	55	0·45	320	1·66	191	1·97	161	0·94	1,700	0·85
	IV.	40	0·64	80	1·45	90	0·86	60	0·41	250	1·05	160	1·30	600	3·12	250	2·58	240	1·41	2,640	1·33
Total ...	...	88	1·42	173	3·14	220	2·11	151	1·04	597	2·52	263	2·14	1,250	6·51	655	6·75	574	3·37	5,992	3·12
Miscellaneous	I.	...	...	...	...	...	...	...	...	4	0·01	1	0·01	4	0·02	4	0·04	1	0·01	15	0·06
	II.	13	0·20	18	0·32	111	1·06	29	0·20	103	0·43	49	0·39	121	0·63	102	1·05	119	0·70	1,087	0·53
	III.	60	0·96	120	2·18	260	2·50	100	0·68	230	0·97	90	0·73	490	2·55	170	1·76	190	1·12	3,430	1·72
	IV.	110	1·77	220	4·00	420	4·03	180	1·24	390	1·64	150	1·22	750	3·90	330	3·40	350	2·06	5,980	3·00
Total ...	...	183	2·93	358	6·50	791	7·60	309	2·13	727	3·06	290	2·36	1,365	7·11	606	6·24	660	3·88	10,512	5·31
Grand Total ...	...	1,052	16·96	1,380	25·09	2,817	27·08	4,068	28·05	3,529	14·89	1,722	14·00	3,396	17·69	1,745	17·99	2,033	11·96	41,328	20·86

Ranikhet Reserve IV. 1.

Boundaries.—North, outer boundary of forest (partly Padholi protected forest, partly village lands, but principally Dwársaon protected forest); east, compartment 17; south, compartment 2; west, outer boundary of forest (cantonment lands of Upat).

Area.—98 acres, of which 3 unproductive.

Configuration and aspect.—Principally irregular, south-westerly slopes of 15°—30°, with deep glens, and drained into the Haswa khála.

Elevation.—Maximum 6,193 feet; minimum 5,500 feet; mean 5,700 feet.

Soil and underlying rock.—Of the same character as in block I. 1; but generally poorer owing to the more open stock.

Stock.—Open middle-aged chír forest on the ridge, spurs and more open slopes; upper broad-leaved forest elsewhere. Mean density in chír forest 0·3, elsewhere 0·4; quality 0·2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	29	2,175	237	10,665	400	8,000	540	4,820	1,206	25,160
Oaks ...	33	2,376	138	2,898	170	1,530	200	600	541	7,404
Miscellaneous,	1	30	128	1,792	250	2,000	440	880	819	4,702
Total ...	63	4,581	503	15,355	820	11,530	1,180	5,800	2,566	37,266

Reproduction.—Co-efficient of completeness, in chír forest 0·2, principally young seedlings; in broad-leaved forest, 0·4.

Accessibility.—On cart road 5 miles from Ránikhet dépôt.

Ranikhet Reserve IV. 2.

Boundaries.—North, compartment 1; east, compartment 17; south, compartments 15, 6 and 4; west, compartment 3, and, simply at a point, outer boundary of forest (cantonment lands of Upat.)

Area.—83 acres, of which 3 unproductive.

Configuration and aspect.—North-easterly and northerly slopes of 15°—30,° forming right-hand side of basin of the Haswa khála.

Elevation.—Maximum 6,050 feet; minimum 5,500 feet; mean 5,800 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally middle-aged pole forest of chír, if we except the abandoned cultivation sites of Koiráli, in which a plantation has been made. Mean density 0·3; quality 0·2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	10	750	97	4,365	156	3,120	210	1,680	473	9,915
Oaks ...	...	...	31	651	40	360	60	180	131	1,191
Miscellaneous,	...	...	37	518	100	800	180	360	317	1,678
Total ...	10	750	165	5,534	296	4,280	450	2,120	921	12,784

Reproduction.—Mean co-efficient of completeness 0·2 ; principally young seedlings of chír.

Accessibility.—½ mile coolie carriage to cart-road, whence 4¾ miles to Ránikhet depôt.

Ránikhet Reserve IV. 3.

Boundaries.—North and west, outer boundary of forest (cantonment lands of Upat) ; east, compartments 2 and 4 ; south, compartment 5 ; west, block I., 15.

Area.—58 acres. of which 2 unproductive.

Configuration and aspect.—A short flat spur running down south-west, whence easterly, southerly and north-westerly aspects, the last usually predominating. Ruling gradients 15°—25.°

Elevation.—Maximum 5,700 feet ; minimum 5,380 feet ; mean 5,480 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally chír pole forest, with young oak in the ravines. Mean density 0·3 ; quality 0 3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class IV.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	26	1,950	220	9,900	365	7,300	490	3,920	1,101	23,070
Oaks .	...	...	...	...	2	18	70	210	72	228
Miscellaneous,	...	...	14	196	80	640	150	300	244	1,136
Total ...	26	1,950	234	10,096	447	7,958	710	4,430	1,417	24,434

Reproduction.—Mean co-efficient of completeness 0·3 ; principally saplings and large seedlings.

Accessibility.—½ mile from cart road, whence 4¼ miles from Ránikhet depôt.

Ránikhet Reserve IV. 4.

Boundaries.—North and east, compartment 2 ; south, compartment 5 ; west and north, compartment 3.

Area.—56 acres, of which 3 unproductive.

Configuration and aspect.—North-easterly slopes of 25°—40,° forming a deep glen.

Elevation.—Maximum 5,967 feet ; minimum 5,380 feet ; mean 5,600 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Chír pole forest, with more or less dense oak coppice in the ravines, valleys and protected aspects. Mean density 0·3 ; quality 0·3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	13	975	256	11,520	417	8,340	580	4,640	1,266	25,475
Oaks ...	...	..	3	63	5	45	40	120	48	228
Miscellaneous,	...	...	6	84	40	320	80	160	126	564
Total ...	13	975	265	11,667	462	8,705	700	4,920	1,440	26,267

Reproduction.—Mean co-efficient of completeness 0·2 ; mainly saplings and small poles.

Accessibility.—¾ mile to cart-road, whence 4¼ miles to Ránikhet depôt,

Ránikhet Reserve IV. 5.

Boundaries.—North, compartments 3, 4 and 2 ; east and south, compartments 6 and 7 ; west, blocks 1., 9, 10 and 15.

Area.—94 acres, of which 3 unproductive.

Configuration and aspect.—The compartment occupies both sides of a sinuous spur, the general direction of which is south-west. The main aspects are southerly and westerly, and the ruling gradients 15°—25°.

Elevation.—Maximum 5,967 feet ; minimum 5,350 feet ; mean 5,630 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally pole forest of chír. Mean density 0·3 ; quality 0 3.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	28	2,100	259	11,655	428	8,560	580	4,640	1,295	26,955
Oaks ...	8	576	68	1,428	86	774	90	270	252	3,048
Miscellaneous,	...	...	34	476	170	1,360	310	620	514	2,456
Total ...	36	2,676	361	13,559	684	10,694	980	5,530	2,061	32,459

Reproduction.—Mean co-efficient of completeness 0·5 ; principally young chír seedlings.

Accessibility.—1 mile to cart-road, whence 4¼ miles to Ránikhet depôt.

Ránikhet Reserve IV. 6.

Boundaries.—North, compartment 2 ; east, compartments 15 and 12 ; south, compartment 7 ; west, compartment 5.

Area.—91 acres, of which 3 unproductive.

Configuration and aspect.—Very irregular slopes, contouring round numerous small spurs running out in various directions ; westerly and southerly aspects predominate. Ruling gradients 20°—30° ; scarps at top of compartment.

Elevation —Maximum 5,967 feet ; minimum 5,270 feet ; mean 5,550 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Chír pole forest on all the spurs and upper slopes ; broad-leaved forest, mainly in the condition of scrub, elsewhere. Mean density 0·3 ; quality 0·4.

Summary of valuation.

Species	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	32	2,400	254	11,430	417	8,340	580	4,640	1,283	26,810
Oaks ...	8	576	49	1,029	60	540	70	210	187	2,355
Miscellaneous,	...	...	35	490	140	1,120	240	480	415	2,090
Total ...	40	2,976	338	12,949	617	10,000	890	5,330	1,885	31,255

Reproduction.—Mean co-efficient of completeness 0·4; principally small chír seedlings, larger advance growth only in patches.

Accessibility.—1¼ miles to cart road, whence 4½ miles to Ránikhet depôt.

Ránikhet Reserve IV. 7.

Boundaries.—North, compartments 5 and 6; east, compartment 12; south, compartments 11, 9 and 8; west, block I., 8 and 9.

Area.—81 acres, of which 3 unproductive.

Configuration and aspect.—Irregular northerly and north-westerly slopes of 15°—25.°

Elevation.—Maximum 5,700 feet; minimum 5,400 feet; mean 5,500 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—As in compartment 1.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	25	1,875	118	5,310	182	3,640	260	2,080	585	12,905
Oaks ...	2	144	102	2,142	134	1,206	160	480	398	3,972
Miscellaneous,	...	...	56	784	320	2,560	590	1,180	966	4,524
Total ...	27	2,019	276	8,236	636	7,406	1,010	3,740	1,949	21,401

Reproduction.—As in compartment 6.

Accessibility.—1½ miles to cart-road, whence 4· miles to Ránikhet depôt.

Ránikhet Reserve IV. 8.

Boundaries.—North, compartment 7; east, compartment 9; south and west, block II., 5 and 3 and block I., 8.

Area.—36 acres, of which 2 unproductive.

Configuration and aspect.—South-westerly and westerly slopes of 20°—30°, drained directly into the Káli ráo.

Elevation.—Maximum 5,600 feet; minimum 5,300 feet; mean 5,420 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally chír pole forest. Mean density 0·6; quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	26	1,950	189	8,505	308	6,160	410	3,280	933	19,895
Oaks ...	...	...	...	...	4	36	50	150	54	186
Miscellaneous,	...	...	27	378	220	1,760	380	760	627	2,898
Total ...	26	1,950	216	8,883	532	7,956	840	4,190	1,614	22,979

Reproduction.—Mean co-efficient of completeness 0·5, principally in patches.

Accessibility.—2 miles to cart-road, whence 1 mile to Ránikhet depôt.

Ranikhet Reserve IV. 9.

Boundaries.—North, compartment 7 ; east, compartments 11 and 10 ; south, block II., 6 and 5 ; west, compartment 8.

Area.—103 acres, of which 4 unproductive.

Configuration and aspect.—Irregular, broken westerly, southerly and easterly slopes of 20°—30°, forming a horse-shoe shaped bay round a loop of the Káli gád.

Elevation.—Maximum 5,700 feet ; minimum 5,300 feet ; mean 5,520 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally chír pole forest, with scrubby broad-leaved trees fringing the ravines and foot of the slopes. Mean density 0·6 ; quality 0·6.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	90	6,750	467	21,015	777	15,540	1,050	8,400	2,384	51,705
Oaks ...	9	648	57	1,197	70	630	80	240	216	2,715
Miscellaneous,	...	...	31	434	230	1,840	420	840	681	3,114
Total ...	99	7,398	555	22,646	1,077	18,010	1,550	9,480	3,281	57,534

Reproduction—Co-efficient of completeness 0·4 ; principally pine saplings and poles. Oak only just beginning to put in an appearance.

Accessibility.—2½ miles from cart-road, whence about one mile to Ránikhet depôt.

Ranikhet Reserve IV. 10.

Boundaries.—North, compartment 11, east, compartments 15 and 13 ; south block II., 9 ; west, block II., 6 and compartment 9.

Area.—96 acres, of which 4 unproductive.

Configuration and aspect.—Principally irregular southerly and south-easterly slopes of 15°—30° drained directly into the Káli gád.

Elevation.—Maximum 5,520 feet ; minimum 5,100 feet ; mean 5,260 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Outside of blank area, now formed into a plantation, much as in preceding compartment.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	66	4,950	358	16,110	582	11,640	810	6,480	1,816	39,180
Oaks ...	1	72	31	651	40	360	50	150	122	1,233
Miscellaneous,	...	...	54	756	170	1,360	290	580	514	2,696
Total ...	67	5,022	443	17,517	792	13,360	1,150	7,210	2,452	43,109

Reproduction.—Co-efficient of completeness 0·4; mainly chír seedlings and saplings. Oaks just beginning to make a show.

Accessibility.—3 miles from cart-road, whence about one mile from Ránikhet depôt; 3½ miles from Chaubattia depôt.

Ranikhet Reserve IV.11.

Boundaries.—North, compartments 7 and 12; east, compartment 15; south, compartment 10; west, compartment 9.

Area.—62 acres, of which 2 unproductive.

Configuration and aspect.—The twin basin of two small feeders of the Lami Ráo. The general fall of the ground is to the south-east, but the local aspects are equally divided between easterly, north-easterly, and south-westerly outlooks. Ruling gradients 15°—25°.

Elevation.—Maximum 5,700 feet; minimum 5,350 feet; mean 5,490 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally a very open forest of chírpoles; mean density 0·3; quality 0·4.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	32	2,400	158	7,110	251	5,020	340	2,720	781	17,250
Oaks	1	72	21	441	26	234	40	120	88	867
Miscellaneous	...	...	13	182	60	480	110	220	183	882
Total ...	33	2,472	192	7,733	337	5,734	490	3,060	1,052	18,999

Reproduction.—Mean co-efficient of completeness 0·5; numerous patches of established chír. Oak just making a beginning.

Accessibility.—2¾ miles from cart-road, whence 1 mile to Ránikhet depôt; from Chaubattia depôt 3½ miles.

Ránikhet Reserve IV. 12.

Boundaries.—North and east, compartment 15; south, compartment 11; west, compartments 7 and 6.

Area.—55 acres, of which 3 unproductive.

Configuration and aspect.—Easterly slopes of 15°—25,° drained directly into the Luiwáni nála.

Elevation.—Maximum 5,900 feet; minimum 5,320 feet; mean 5,570 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—A slightly improved specimen of that in the preceding compartment.

Summary of valuation..

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	24	1,800	165	7,425	280	5,600	380	3,040	849	17,865
Oaks	3	216	40	840	50	450	80	240	173	1,746
Miscellaneous ...	...	...	18	252	120	960	220	440	358	1,652
Total ...	27	2,016	223	8,517	450	7,010	680	3,720	1,380	21,263

Accessibility.—1½ miles to cart-road, whence 4¼ miles from the Ránikhet depôt.

Ranikhet Reserve IV. 13.

Boundaries.—North, compartment 15; east, compartments 16 and 14, and, for a few yards, outer boundary of forest (village lands); south, block III., 6; west, block III., 6, block I., 9, and compartment 10.

Area.—104 acres, of which 4 unproductive.

Configuration and aspect.—Principally westerly slopes of 15°—25,° with a short sweep of southerly slopes, where the Káli gád bends round to the east at Kilkhet.

Elevation.—Maximum 5,659 feet; minimum 4,950 feet; mean 5,250 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Outside the deserted fields of Dalmoti, which have been planted up with deodar, wattles, &c, principally a chír pole forest with a broad-leaved belt running along the moist slopes just above the Lami Ráo and Káli gád. Mean density 0·6; quality 0·6.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	103	7,725	351	15,795	572	11,440	780	6,240	1,806	41,200
Oaks	13	936	51	1,071	66	594	90	270	220	2,871
Miscellaneous	...	...	111	1,554	260	2,080	420	840	791	4,474
Total ...	116	8,661	513	18,420	898	14,114	1,290	7,350	2,817	48,545

Reproduction.—Co-efficient of completeness 0·4; principally saplings and poles in larger or smaller patches.

Accessibility.—3½ miles from cart-road, whence 1 mile from Ránikhet depôt; 3½ miles from Chaubattia depôt.

Ranikhet Reserve IV. 14.

Boundaries.—North and east, outer boundary of forest (village lands); south and west, block III., 9, 8, 7, and 6; west, compartment 13.

Area.—145 acres, of which 6 unproductive.

Configuration and aspect.—A long sweep of westerly and south-westerly slopes of 20°—30,° drained directly into the Káli gád.

Elevation.—Maximum 5,659 feet; minimum 4,910 feet; mean 5,250 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Principally chír pole forest. Mean density 0·5; quality 0·6.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír	47	3,525	768	34,560	1,183	23,660	1,610	12,880	3,608	74,625
Oaks	2	144	39	819	50	450	60	180	151	1,593
Miscellaneous	...	...	29	406	100	800	180	360	309	1,566
Total ...	49	3,669	836	35,785	1,333	24,910	1,850	13,420	4,068	77,784

Reproduction.—Mean co-efficient of completeness 0·4; principally saplings and poles; recent seedlings fairly good in patches.

Accessibility.—3½ miles from cart-road, whence 4 miles to Ránikhet depôt; 3¼ miles to Chaubattia depôt.

Ranikhet Reserve IV.15.

Boundaries.—North, compartment 2; east, compartments 17 and 16; south, compartment 13; west, compartments 10, 11, 12, and 6.

Area.—237 acres, of which 10 unproductive.

Configuration and aspect.—A very long stretch of south-westerly slopes of 25°—35° and furrowed by numerous short ravines and gullies.

Elevation.—Maximum 6,800 feet; minimum 5,300 feet; mean 5,600 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—An open pole forest of chír, with board-leaved species fringing the Lami ráo, and running up some of the ravines and gullies. Mean density 0·2; quality 0·3.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	128	9,600	431	19,305	696	13,920	950	7,600	2,205	50,515
Oaks ...	34	2,248	143	3,003	170	1,530	250	750	597	7,731
Miscellaneous,	4	120	103	1,442	230	1,840	390	780	727	4,182
Total ...	166	11,968	677	23,840	1,096	17,290	1,590	9.130	3,529	62,428

Reproduction.—Mean co-efficient of completeness 0·2; chír poles in patches, and scattered seedlings everywhere.

Accessibility.—2½ miles from cart-road, whence 4½ miles to Ránikhet depôt; 5 miles from Chaubattia depôt.

Ranikhet Reserve V. 16.

Boundaries.—North, compartment 17; east and south, outer boundary of forest (village lands); south-west, compartments 13 and 15.

Area.—123 acres, of which 5 unproductive.

Configuration and aspect.—Principally irregular south-easterly slopes of 20°—30°, drained directly into the Batulia gád.

Elevation.—Maximum 5,750 feet; minimum, 5,300 feet; mean 5,500 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Chír pole forest, with oak in the ravines and at the bottom of the compartment. Mean density 0·4; quality 0·5.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	29	2,175	235	10,575	385	7,700	520	4,160	1,169	24,610
Oaks ...	3	216	45	945	55	495	160	480	263	2,136
Miscellaneous,	1	30	49	686	90	720	150	300	290	1,736
Total ...	33	2,421	329	12,206	530	8,915	830	4,940	1,722	28,482

Reproduction.—Mean co-efficient of completeness 0·4. Small poles of chír every where in chír forest; seedlings and saplings mainly in patches. In broad-leaved belts, oak saplings and poles very abundant.

Accessibility.—2¾ miles to cart-road, whence 4½ miles to Ránikhet depôt; 4½ miles to Chaubattia depôt.

Ranikhet Reserve IV.17.

Boundaries.—North, outer boundary forest (Dwársaon protected forest); east and north, compartments 18 and 19; south, compartment 16; west, compartments 15, 2 and 1.

Area.—192 acres, of which 9 unproductive.

Configuration and aspect.—A very long stretch of irregular north-easterly slopes of 25°—35.°

Elevation.—Maximum 6,193 feet; minimum 5,350 feet; mean 5,600 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—The chír and upper broad-leaved types more or less equally distributed, the former being most abundant at the northern extremity. Numerous blanks, being old deserted cultivation sites. Outside these blanks mean density 0·3; quality 0·4.

Summary of valuation.

Species.	Girth-class I.		Girth-class II.		Girth-class III.		Girth-class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	14	1,050	157	7,065	260	5,200	350	2,800	781	16,115
Oaks ...	64	4,608	266	5,586	320	2,880	600	1,800	1,250	14,874
Miscellaneous,	4	120	121	1,694	490	3,920	750	1,500	1,365	7,234
Total ...	82	5,778	544	14,345	1,070	12,000	1,700	6,100	3,396	38,223

Reproduction.—Mean co-efficient of completeness 0·3. A few good patches of established chír; young seedlings beginning to make a show. Oak coppice-scrub abundant at northern extremity.

Accessibility.—2 miles from cart-road, whence 5 miles from Ránikhet depôt; 5¼ miles from Chaubattia depôt.

Ranikhet Reserve IV. 18.

Boundaries.—North, outer boundary of forest (Dwársaon protected forest); east, compartment 19; south and west, compartment 17.

Area.—97 acres, of which 6 unproductive.

Configuration and aspect.—The compartment stretches across two prominent spurs, which run down south from the Taichulia ridge. Local aspects alternately westerly and easterly. Ruling gradients 20°—35.°

Elevation.—Maximum 6,362 feet; minimum 5,400 feet; mean 5,800 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—Scattered, unpromising chír on the spurs and exposed slopes; elsewhere open scrub of broad-leaved species. Mean density 0·2; quality 0·2.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	19	1,425	164	7,380	131	2,620	170	1,360	484	12,785
Oaks ...	56	4,032	158	3,318	191	1,719	250	750	655	9,819
Miscellaneous,	4	120	102	1,428	170	1,360	330	660	606	3,568
Total ...	79	1,977	424	12,126	492	5,699	750	2,770	1,745	26,172

Reproduction.—Mean co-efficient of completeness 0·3. Scattered poles and saplings of chír, but seedlings interspersed throughout. In broad-leaved forest scrubby coppice.

Accessibility.—1½ miles to cart-road, whence 6 miles to Ránikhet depot.

Ranikhet Reserve IV. 19.

Boundaries.—North, outer boundary of forest (Dwarsaon protected forest); east, outer boundary of forest (village lands); south and west, compartment 17; west and north, compartment 18.

Area.—170 acres, of which 9 unproductive.

Configuration and aspect.—Irregular, deeply furrowed south-westerly slopes of 20°—35,° drained directly into the Lami Dhar Gadhera.

Elevation.—Maximum 6,350 feet; minimum 5,350 feet; mean 5,700 feet.

Soil and underlying rock.—As in compartment 1.

Stock.—An inferior specimen even of stock in compartment 18.

Summary of valuation.

Species.	Girth—class I.		Girth—class II.		Girth—class III.		Girth—class IV.		Total.	
	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.	Number of trees.	Maunds of wood.
Chír ...	41	3,075	258	11,610	210	4,200	290	2,320	799	21,205
Oaks ...	43	3,096	130	2,730	161	1,449	240	720	574	7,995
Miscellaneous,	1	30	119	1,666	190	1,520	350	700	660	3,916
Total ...	85	6,201	507	16,006	561	7,169	880	3,740	2,033	33,116

Reproduction,—Worse than in compartment 18.

Accessibility.—2½ miles from cart-road, whence 6 miles from Ranikhet depôt.

Part III.

THE ORGANIZATION SCHEME.

The proposals constituting together the organization scheme will be grouped together in seven chapters as under :—

I.—Improvement of boundaries.

II.—The exploitability and rotation.

III.—General treatment and working.

IV.—The working plan.

V.—The financial forecast.

VI.—Forecast of future condition of stock.

VII.—Scrutiny and revision of general provisions of organization scheme.

CHAPTER I.—IMPROVEMENT OF BOUNDARIES.

The serious defects in the present boundaries and the necessity of at once taking measures to correct them have been indicated on page 10. The divisional officer will be able better than any one else to plan and carry out the work, but the following suggestions are offered for what they may be worth.

Where the boundary follows natural features, such as streams, crests of prominent spurs, and permanent roads, it should be merely marked by a sufficient number of pillars. Where it cuts across such features, but is a straight line, in addition to the main pillars at the several angles, small intermediate pillars, visible from each other, should be placed along the longer lines, or conspicuous trees standing on the lines may be marked with a ring of paint and a numbered slab of wood. Lastly, where the line from one pillar to the next is neither straight nor an easily recognisable natural feature, a 2-feet path should be cut and carefully maintained along it. Usually these irregular lines follow more or less horizontal contours, and thus offer no difficulty for the construction of such paths. In the exceptional cases in which the lines run along gradients too steep for a path, exchanges may be made through the civil authorities with the villages so as to secure more convenient lines. There can be no doubt that such paths constitute almost the best, if not the very best, form of boundary line : they are at once recognised, are easily and economically kept up, are easily and rapidly inspected, and are by far the most convenient guide and check-lines for the clearing, maintenance and inspection of fire-traces. So that even where the boundary runs perfectly straight between two pillars, it will generally be found expedient to modify it so as to render the construction of a good foot-path feasible.

The establishment, if practicable, of a clump of some conspicuous evergreen trees, like deodar for instance, at all angles would be very desirable.

CHAPTER II.—THE EXPLOITABILITY AND ROTATION.

The main object in treating and working these forests being to obtain fuel, we must endeavour to secure the largest annual yield possible of merely sound wood ; and accordingly the rotation or age of exploitation should be so chosen that it gives the highest mean annual increment.

Chír is, and will always be, the most extensively distributed and most productive tree of these forests, oak coming next, and the rest practically nowhere. In the treatment to be adopted we must, therefore, consider chír as the principal tree, oak as the auxiliary tree, and all the rest as accessory trees. Hence in determining the rotation we need take account only of chír and the oaks.

In the case of pure chír forest the highest mean annual increment per individual tree occurs, as will be seen from the statement below, at 162 years :—

Age of tree.	Average girth at breast height attained.	Average yield.	Mean annual increment.	Remarks.
Years.		Cubic feet.	Cubic feet.	
70	2′ 10″	18	0·26	These figures are obtained from Part I., Chapter II., Section IV., Article 2.
98	3′ 9″	42	0·43	
105	4′ 0″	49	0·47	
152	5′ 0″	89	0·59	
162	5′ 2″	98	0·60	
203	6′ 0″	116	0·57	

As regards the oaks, bánj alone is worthy of any consideration. We have no data for determining, as has been done for chír, the rotation for pure oak forest. But as that type is of very limited distribution and occurs only in patches and narrow belts in the midst of chír forest, this drawback is practically of no consequence, especially as the type in question is found in places where caution is to be observed in the fellings.

Thus we have only to consider bánj as an auxiliary associate of chír, and as we know that the rate of its growth in volume is pretty uniform till a late age, we can have no hesitation in adopting for the rotation whatever term suits chír.

Obviously the mean annual increment of a single tree, although growing in leaf-canopy, is not necessarily the same thing as the mean annual increment of a definite tree-covered area ; but in the case of chír in these forests the spread of its crown increases very little after it is about 4′ 6″ in girth, when it has practically reached its maximum height, and a tree 5′ 2″ in girth scarcely requires more free space than a tree of 4′ 6.″ Up to this no consideration has been given to the intermediate yield of improvement thinnings; but it is evident that the productiveness of these cuttings increases with the age of the forest until several years after the trees have attained their maximum height. Hence we are justified in assuming, until more direct and complete data are available, the same age of exploitability for the forest as for the individual tree.

Thus our rotation is fixed for us at 160 years. This rotation will furnish not only mere fuel trees, but also trees large enough for all descriptions of beams and scantlings.

CHAPTER III.—GENERAL TREATMENT AND WORKING.

The natural reproduction of chír in the Ránikhet forests can be effected with such ease and certainty within a space of 20 years that there can be no question regarding the expediency of establishing a regular gradation of age-classes in every one of these forests, which the prevailing administrative and economic conditions will allow to be worked permanently in a systematic manner.

The Ránikhet Reserve.

The Ránikhet reserve is obviously in this category ; and as it is indisputable that under the special conditions of soil, climate and species in which it is placed, the yield of the area will be largest under a regular gradation of age-classes, that system of treatment should from the very outset be applied ,in working it. But in the present very irregular condition of the stock, we cannot without serious loss of production, attempt at once to introduce the system in all its elaborate details. We must be content to make only a beginning, such a beginning as will result in broad, yet distinct, age-classes being established on the ground.

From the figures on page 49 it will be seen (1) that at the age of 40 years chír poles are just over 18 inches in girth, that is to say, have already entered the fourth class ; (2· that just before they are 80 years old, they have entered the third class ; and (3) that in their 121st year they are about to reach the second class. This circumstance at once gives us four working periods of 40 years each, which coincide almost exactly with the ages at which chír attains successively the fourth, third and

second classes, and finally exploitability. As a space of 20 years would appear, from our present knowledge, to suffice for the complete natural regeneration of any given area, we might adopt eight instead of the above four age-classes ; but, as said above, we must now not attempt too much and be content with successfully establishing five broad, but distinct, *such* classes.

The reserve, being the only area over which the department has at present complete and exclusive control, and intended, as it is, to form eventually the sole source of supply of fuel and timber for the troops (unless of course the garrison is very materially increased), will be best treated as a separate and independent working centre.

It might be asked, why not divide it into two independent working centres, one for the supply of the Ránikhet commissariat depôt, the other for that at Chaubattia? The reply to this is very simple and obvious. The entire productive area of the forest is only about 4,500 acres, which would give less than 30 acres per annum. To split up such a small area would be conducive neither to efficiency nor economy. It may be argued against the plan proposed that the saving in carriage to the Chaubattia depôt would be an important item. At present no doubt it is, but when the age-classes have been established, a large quantity of produce will be obtained from a few acres, and all the work concentrated each year at a single point. Improved and therefore cheaper modes of export will then be practicable, and render the difference of an extra mile or two of lead insignificant, and the small difference will be more than covered by the saving on the cost of easier exploitation, treatment and supervision.

It is hardly necessary to add that the treatment of the entire area as a single working centre need not, until the age-classes have been established, prevent a sufficient quota of produce from being cut by jardinage within the radius from which the Chaubattia depôt is at present supplied, and actually in the special prescriptions of this working plan such a provision has been made.

The Protected Forests.

If these forests are to be worked and still maintained as forests, their reproduction must be assured. This must be done even if no wood were to be cut out of them except for the use of the villagers, for the present heavy grazing, with the wholesale lopping of all broad-leaved trees, large or small, old or young, must in the end, unless the progress of reproduction is rendered more satisfactory, result in the forest deteriorating to such an extent that it will be unable to meet even the bare local requirements. Mere protection from fire, although it will accomplish a great deal, may be just able to save the forests for the villagers ; but in the present case larger interests than the single interests of the villagers are involved. These forests are not the exclusive property of those villagers, and granting that their wants should be first of all supplied, there is no reason why all the surplus produce that *can* be realized by means of proper treatment and practicable conservancy, should not be otherwise utilized. Indeed the sole object with which the forests were put under professional management was to husband their resources for the benefit of the garrison, after satisfying the legitimate requirements of the local population. To go down to the distant Bhábar for timber and fuel for the cantonment, when they are available in sufficient quantity almost on the spot, is hence quite out of the question.

We have thus the problem set before us for solution :—By what means, without infringing vested interests or causing any real hardship to the surrounding population, can we ensure the regeneration of these protected forests, in order not merely to maintain them in their present condition, but also to increase their productiveness while steadily utilizing to the utmost the resources they offer?

There is only one solution to this problem and that is that a certain definite area should be successively brought under regeneration and, for the time being, protected from all obstacles to the successful issue of the operations. Protection from fire and from unauthorized felling has already been successfully accomplished : to this must now be added protection against cattle and lopping.

We have already seen that a period of 20 years suffices in these forests for the production and establishment of a complete crop of self-sown seedlings. Seedlings 20 years old are obviously still within reach of the mouth of cattle ; but chir is not a fodder tree, and the 20-year old chír sapling is evidently too large to be trampled down or crushed. Hence cattle admitted amongst chir of that age could do no appreciable damage. The 20-year old sapling of broad-leaved species is of course liable to be browsed down ; but however old it may be, it cannot enjoy perpetual immunity from the graziers' pruning bill except in closed areas, and as the entire area can never be closed, it must ultimately, under any circumstances, fall a victim to annual lopping. But the 20-year old sapling has this immense advantage over the seedling that has just come up, that it can neither be plucked out by the roots by browsing cattle nor be trampled to death under their feet. Thus any area, closed against grazing and lopping for 20 consecutive years, will become stocked with as complete a new crop as can ever be produced under the conditions in which these forests are placed.

I would, therefore, propose that instead of seeking to obtain reproduction by means of jardinage fellings all over the area of these forests, a certain definite area in each forest be specially taken in hand for natural regeneration. The rotation being one of 160 years, the average area abstracted from the open area each year need not be more than $\frac{1}{160}$ of the entire area of each forest; and as each such area would have to be kept closed for 20 years, until the new reproduction was established, at no time would more than one-eighth of the extent of any forest be closed to the free run of cattle and indiscriminate lopping of broad-leaved trees. As chír seed sometimes fails for one or two years, it would often happen that although a certain area was closed, the forest officer would permit light grazing in it. Obviously the closed area should be all in one piece in each forest.

Closing would obviously not mean the complete exclusion of the villagers from participation in the produce furnished by the area in question during the period of closure ; for an excellent crop of both fodder and thatching grass would be available when all the open area had been grazed down, and the removal of a portion of the fallen pine needles would generally be allowed in the special interests of the reproduction itself. And not only this, but light grazing would not unfrequently be permitted before the expiration of the 20 years in many areas in which the pine seedlings had become large enough to escape being trampled down and crushed or broken, and there was no young broad-leaved growth to be browsed off.

One more justification for the plan proposed is the well-known fact that when, in the working and management of a forest, provision has to be made for a certain heavy amount of grazing, an indispensable condition for the regulation of the grazing and the maintenance of the forest and its productiveness is the formation of age-classes within well-defined limits.

The only objection that can be made to the plan of periodical closure by rotation would be that the privileged villages would clamour against its execution ; but actually no ground is left for such objection to be raised, since very much more than one-twentieth of the aggregate area of the protected forests has already been closed by order of Government.

No doubt the best system of all would be the permanent reservation, under the Forest Act, of the better portions of these protected forests, leaving out a sufficient area for the satisfaction of the wants of the people, as had been contemplated by Government in 1871. Should such an eventuality occur, the new reserves would have to be treated on similar lines with those proposed for the present reserve. But the procedure for reservation is a long one, and in the meantime, until it could be completed, the plan suggested in the preceding paragraphs should be followed. As that plan resembles, in its essential principles, that proposed for the present reserve, in the event of the new reserves being formed, the immediate substitution of the one for the other would be effected without any hitch or temporary dislocation in the

progress of working and management, and thus no time will have been lost in the restoration of these forests.

CHAPTER IV.—DETAILED PROPOSALS.

In the preceding chapter the general lines on which work should be carried on have been suggested. They embrace an interval of 106 years. It is evident that the detailed proposals further defining the procedure cannot, under the most favourable circumstances and with the most intimate knowledge of the forests concerned, be attempted for so long a space of time. Even in Europe, where three centuries of systematic management have resulted in the laws of forest growth and production in those regions being understood with great precision, it is customary to prescribe in detail for only the extent of a single working period and to provide for a scrutiny and revision at the expiration of half or one-third that period. In the present case the working period is 40 years. But as the habits and requirements of the various species composing the stock of the Ránikhet forests, and the influence of their present surroundings on their reproduction and growth, are still only imperfectly understood, and as those influencing conditions, notably the exercise of rights and the nature of the conservancy and treatment, are liable to radical change in no distant future, it has seemed advisable to limit the detailed provisions of the present working plan to only 10 years, while nevertheless discussing and suggesting in a general manner the details for the entire period of 40 years. It was found impossible to strictly confine the proposals to the sub-period of 10 years. The main object of the working plan being to establish age-classes rising by 40 years, and the four highest of these age-classes coinciding exactly with the four girth-classes on which the counting of the trees was based, it is obvious that the detailed provisions for 10 years could not be considered apart from the general procedure to be followed during the entire first period of 40 years. Any new proposals that may be made after the close of the first 10 years will not necessarily constitute a *new* working plan, but will in all probability be merely a further development of the same procedure, only modified and corrected in details in accordance with the more perfect information which the 10 years' working will have rendered available.

SECTION 1.—QUOTA OF FELLINGS.

The number of trees of the various species and girth-classes that may be felled during the first working period of 40 years has been estimated in the subjoined statement. This estimate has been based on the following principles and assumptions :—

(1) All chír trees 5′2″ and upwards in girth to be cut.

(2) The proportion of chír trees 5′2″ and upwards in girth, comprised in the second girth-class, is about one-half of the total number in that class.

(3) Oaks and other broad-leaved trees to be spared as much as possible for seed ; but all trees above six feet in girth to be removed, as also the following percentages, more or less, of those in the second girth-class (the most unsound and least promising of that class) :—

Oaks	20	per cent.
Other species	40	per cent.

(4) The proportion of trees of the third and fourth girth-classes that cannot survive or ought not to be preserved until they reach the higher class, either because they are unsound or because they stand too close to, and injure other trees more valuable than themselves, is more or less as under :—

	Chír.	*Oaks.*	*Other species.*	
Third class ...	25	20	40	per cent.
Fourth „ ...	30	30	30	per cent.

Some of the figures assumed above may appear to require justification ; but their explanation would lead me too far without any compensating advantage. Suffice it to say that they are based on a careful study of the present stock and its peculiar surroundings.

Estimate of trees to be felled during the next 40 years.

Species of tree.	Girth-class.	Sauni.	Siun.	Kathálekh.	Ganiádeoli.	Chiliánáo.	Kárchúli.	Padholi.	Dwársaon.	Ránikhet Reserve.	Chaubattia West.	Chaubattia East.	Grand Total.
		Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.	Number of trees.
Chír	I.	3,064	1,189	3,402	1,015	340	774	829	437	2,066	474	635	14,225
	II.	4,800	500	3,400	2,100	900	500	1,400	700	11,300	400	1,400	27,400
	III.	6,500	1,000	5,000	2,000	1,300	350	1,400	600	8,000	600	1,500	28,250
	IV.	30,000	3,500	15,000	4,000	9,000	1,800	10,000	7,000	10,000	1,000	4,000	95,300
Total ...		44,364	6,189	26,802	9,115	11,540	3,424	13,629	8,737	31,366	2,474	7,535	165,175
Oaks	I.	7,085	2,024	306	2	...	...	42	933	1,148	231	540	12,311
	II.	1,900	500	80	2	...	...	16	300	900	70	200	3,968
	III.	3,700	900	300	10	1	...	70	800	1,200	200	800	7,981
	IV.	12,000	2,000	1,000	40	...	...	500	4,000	2,000	300	3,000	24,840
Total ...		24,685	5,424	1,686	54	1	...	628	6,033	5,248	801	4,540	49,100
Other species ...	I.	994	387	60	1	1	...	19	146	148	32	226	2,014
	II.	1,200	300	90	2	2	...	20	200	500	20	200	2,534
	III.	4,000	900	600	10	30	...	180	400	1,200	80	1,200	8,600
	IV.	18,000	4,000	2,000	80	400	20	1,200	2,300	1,800	200	3,000	33,000
Total ...		24,194	5,587	2,750	93	433	20	1,419	3,046	3,648	332	4,626	46,148
Grand Total ...		93,243	17,200	31,238	9,262	11,974	3,444	15,676	17,816	40,262	3,607	16,701	260,423

The number of trees that will be required by the villagers may be estimated thus from the average figures of the last five years :—

Species.	Whether trees or poles.	Number to be supplied from—									
		Sanni.	Siun.	Kathálekh.	Gonádeoli.	Chiliánáo.	Kárchuli.	Padholi.	Dwársáon.	The Chaulattias.	All the protected forests.
Chír	Trees ...	9,680	360	1,960	1,160	80	80	1,240	880	1,680	17,120
	Poles ...	59,800	3,320	10,160	4,560	600	2,680	14,960	7,680	5,840	109,520
Total ...	...	69,480	3,680	12,120	5,720	680	2,600	16,280	8,560	7,520	126,640
Oaks	Trees ...	...	...	...	...	—	...	...	...	...	...
	Poles ...	11,600	240	1,200	...	...	...	200	1,640	800	15,680
Total ...	...	11,600	240	1,200	...	...	...	200	1,640	800	15,680
Other species ...	Trees ...	40	...	...	...	...	...	...	...	...	40
	Poles ...	760	...	...	...	...	...	...	...	40	800
Total ...	...	800	...	...	...	...	...	...	...	40	840
Grand Total ...	...	81,880	3,920	13,320	5,720	680	2,680	16,400	10,200	8,360	143,160

Making due allowance for these requirements, we have the following quota left for the commissariat fuel supply and for sale to other public departments and the general public :—

Quantity of exploitable material available after supplying villagers' requirements.

Species.	Girth-class.	Sauni.		Siun.		Kathalekh.		Ganiadeoli.		Chilianao.		Karchuli.		Padholi.		Dwarsaon.		Ranikhet reserve.		Chaubattia west.		Chaubattia east.		Grand total.	
		Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.
Chir ...	I.	3,064	229,800	1,189	89,175	3,402	255,150	1,015	76,125	340	25,500	774	58,050	829	62,175	437	32,775	2,066	154,950	474	35,550	635	47,625	14,225	1,066,875
	II.	...	...	140	6,300	1,440	64,800	940	42,300	820	36,900	420	18,900	160	7,200	...	...	11,300	508,500	...	...	120	5,400	15,340	690,300
	III.	1,620	32,400	1,000	20,000	5,000	100,000	1,440	28,800	1,300	26,000	...	...	...	...	...	...	8,000	160,000	...	...	1,360	27,200	19,720	394,400
	IV.	...	...	180	1,440	4,840	38,720	...	...	8,400	67,200	...	...	...	...	...	...	10,000	80,000	...	...	...	...	23,420	187,360
Total ...	...	4,684	262,200	2,509	116,915	14,682	458,670	3,395	147,225	10,860	155,600	1,194	76,950	989	69,375	437	32,775	31,366	903,450	474	35,550	2,115	80,225	72,705	2,338,935
Oaks ...	I.	7,085	510,120	2,024	145,728	306	22,032	2	144	...	...	...	...	42	3,024	933	67,176	1,148	82,656	231	16,632	540	38,880	12,311	886,392
	II.	1,000	21,000	500	10,500	80	1,680	2	42	...	...	...	...	16	336	300	6,300	900	18,900	70	1,470	200	4,200	3,068	64,428
	III.	...	...	660	5,940	100	900	10	90	1	9	...	...	...	...	...	...	1,200	10,800	...	...	500	4,500	2,471	22,239
	IV.	5,000	15,000	2,000	6,000	...	...	40	120	...	...	...	...	370	1,110	3,160	9,480	2,000	6,000	...	...	3,000	9,000	15,570	46,710
Total ...	...	13,085	546,120	5,184	168,168	486	24,612	54	396	1	9	...	...	428	4,470	4,393	82,956	5,248	118,356	301	18,102	4,240	56,580	33,420	1,019,769
Other species ...	I.	994	29,820	387	11,610	60	1,800	1	30	1	30	...	...	19	570	146	4,380	148	4,440	32	960	226	6,780	2,014	60,420
	II.	1,160	16,240	300	4,200	90	1,260	2	28	2	28	...	...	20	280	200	2,800	500	7,000	20	280	200	2,800	2,494	34,916
	III.	3,240	25,920	900	7,200	600	4,800	10	80	30	240	...	...	180	1,440	400	3,200	1,200	9,600	40	320	1,200	9,600	7,800	62,400
	IV.	18,000	36,000	4,000	8,000	2,000	4,000	80	160	400	800	20	40	1,200	2,400	2,300	4,600	1,800	3,600	200	400	3,000	6,000	33,000	66,000
Total ..	...	23,394	107,980	5,587	31,010	2,750	11,860	93	298	433	1,098	20	40	1,419	4,690	3,046	14,980	3,648	24,640	292	1,960	4,626	25,180	45,308	223,736
Grand Total ...	...	41,163	916,300	13,280	316,093	17,918	495,142	3,542	147,919	11,294	156,707	1,214	76,990	2,836	78,535	7,876	130,711	40,262	1,046,446	1,067	55,612	10,981	161,985	151,433	3,582,440

Assuming that the present commissariat fuel requirements (64,000 maunds) will not be exceeded, there will thus be 1,000,000 maunds to spare. Advantage should be taken of this circumstance to exclude from the area of the fuel operations all the more distant compartments so as to reduce to a minimum the cost of carriage, which is, and always will be, the heaviest item in the expenditure. Such are compartments 2, 3 and 28—33 of Sauni and the whole of Siun except compartments 1 and 2. These several compartments could be used for supplying, firstly, the villagers, and, secondly, by means of the balance of exploitable stock, the general public and the Military Works and other public departments. This abstraction from the limits of the commissariat fuel operations would diminish the supply of firewood available for the troops by only 382,000 maunds, so that a very large reserve of more than 600,000 maunds would still be left to draw upon in case of necessity or to meet other requirements.

SECTION II.—SPECIAL PROPOSALS FOR THE RESERVED FOREST.

The quantity of stock removeable during the first 40-year period has been estimated in the statement on page 206. In the statement below the distribution of that quantity amongst the four several blocks is shown. Block I., being the most conveniently situated and that in which the reproduction is on the whole the most advanced, is proposed to be taken in hand during this period for the establishment of a distinct age-class, the remaining three blocks being worked by jardinage as hitherto, but with due and constant regard to their eventually coming in their proper turn under the same system of treatment as block I. This being the case, it is evident that nearly all the older and larger trees, which interfere with the development of the younger portion of the crop, should be cut out of block I, so that the resulting crop may be as uniform as possible and consist as far as practicable of individuals from 1 to 40 years old. Looking at the present condition of the stock, the presence in the immediately succeeding crop of many trees above 40 and up to 80 years old will be unavoidable; but at any rate the first and really effective step towards the realization of a normal age-class will have been taken, making subsequent progress comparatively easy.

In the blocks still worked by jardinage, the guiding principle will be different according to the relative order in which they will be taken up for the establishment of age-classes. This order will doubtlessly be the same as that of their consecutive numbering, advance growth being most abundant in block II., and least so in block IV. It was this circumstance which necessitated the alteration of Mr. Brereton's consecutive numbering, in which what are now blocks II., III., and IV., were respectively blocks III., IV., and II. Hence the exploitations will be most sparing in block II., which will have to furnish the largest portion of the yield during the second 40-year period. On this principle the heaviest jardinage fellings ought to take place in block IV., but that area is so poorly stocked that it must be worked with a comparatively light hand.

With these explanations the following scheme of exploitations during the next 40 years is proposed :—

Species.	Girth-class.	To come out of—									
		Block I.		*Block IV.*		*Block II.*		*Block III.*		*Total for entire reserved forest.*	
		Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.
Chír ...	I.	453	33,975	782	58,650	503	37,725	328	24,600	2,066	154,950
	II.	5,548	249,660	2,500	112,500	1,700	76,500	1,552	69,840	11,300	508,500
	III.	3,000	60,000	1,800	36,000	1,200	24,000	2,000	40,000	8,000	180,000
	IV.	4,000	32,000	2,200	17,600	1,500	12,000	2,300	18,400	10,000	80,000
Total ...	...	13,001	375,635	7,282	224,750	4,903	150,225	6,180	152,840	31,366	903,450
Oaks ...	I.	122	8,784	280	20,160	412	29,664	334	24,048	1,148	82,656
	II.	100	2,100	200	4,200	260	5,460	340	7,140	900	18,900
	III.	200	1,800	350	3,150	300	2,700	350	3,150	1,200	10,800
	IV.	400	1,200	580	1,740	480	1,440	540	1,620	2,000	6,000
Total ...	...	822	13,884	1,410	29,250	1,452	39,264	1,564	35,958	5,248	118,356
Other species...	I.	4	120	15	450	95	2,850	34	1,020	148	4,440
	II.	60	840	30	420	200	2,800	210	2,940	500	7,000
	III.	400	3,200	90	720	350	2,800	360	2,880	1,200	9,600
	IV.	600	1,200	140	280	500	1,000	560	1,120	1,800	3,600
Total ...	...	1,064	5,360	275	1,870	1,145	9,450	1,164	7,960	3,648	24,640
GRAND TOTAL,	...	14,887	394,879	8,967	255,870	7,500	198,939	8,908	196,758	40,262	1,046,446

The quota of produce to come out of each block during the next 40 years being fixed, it would be a decided mistake, in the present irregular condition of the stock, to tie the hands of the executive forest officer by prescribing in a rigid manner the order of the fellings according to compartments and blocks, and the exact quantity to take out of each compartment. The stock in each compartment must be dealt with on its own merits, and the best judge in the case would be the executive officer having the full leisure to examine, marking-hammer in hand, the stock at each point, and to appreciate what should be done there.

So long as the 25,000 maunds, more or less, are exported every year from the entire area of the reserve, it does not matter, as far as the working plan is concerned, from what points the quota in any year is made up.

It is evident that block I. will require the most careful and elaborate treatment, and that the interests of the rest, when there is any clashing, should in most cases yield to those of that block. For the first subperiod of 10 years, during which this plan will be in force, the following procedure, on account of its simplicity and its leaving little room for any serious error of judgment, is recommended. The area of block I. being 832 acres, regeneration thinnings should be made over one-tenth of that extent, or 83 acres per annum ; the balance of the annual quota should then be taken by means of jardinage fellings from the remaining three blocks in the proportion respectively of the exploitable material in each. The regeneration thinnings should not be too heavy, their object being to free sufficiently the advance growth where there is advance growth, and to encourage the appearance of new seedlings where there are none. It should be remembered that during the remaining 30 years of the first 40-year period, three more series of regeneration thinnings, including the final felling, will most probably pass through the area. The first series of thinnings should, therefore, only give the young seedlings sufficient light and growing room for about 10 years. In thinning out the denser patches of old advance growth, it should not be forgotten that we want the trees to grow in height as well as in thickness, and that we must not stunt the future trees merely in order to get them to increase in diameter rapidly. In these regeneration thinnings all small and unpromising poles of broad-leaved species should be cut back flush with the ground, so that they may renew themselves by means of strong and healthy coppice shoots.

The thinnings just described will probably yield on an average about 12,000 maunds annually, leaving 13,000 maunds to be obtained from the remaining three blocks. The jardinage fellings in those blocks should first of all include only dead and dying trees and such as are doing immediate and serious harm to overtopped or neighbouring individuals of greater value or promise. The main object to be kept in view in the treatment of the blocks in question is, while incidentally preserving any advance growth that may be found on the ground, to increase the productiveness, *i.e.*, the cubical contents of the standing stock as much as practicable. In carrying out this object, new reproduction, to a less or greater extent, will of itself make its appearance to facilitate work when the true regeneration thinnings follow in due course.

In conclusion and in justification of the proposals comprised in this section, it is necessary only to say that in devising them the end rigidly kept in view has been to render, as quickly as possible, the resources of the Ránikhet reserve alone equal to furnishing the entire supply of firewood for the garrison. To what extent the measures proposed are expected to fulfil this end is explained in Chapter VI.

Section III.—Proposals for the Protected Forests.

After what has been proposed and discussed in Chapter III, pages 200-202, very little remains to be added. If the measures in question are sanctioned, regeneration

thinnings will have to be made in each closed area as it was taken up. With the exception of about one-third of the Sauni forest and a few patches in other forests, notably Chiliánáo and Padholi, the stock is at present so open that very little can be taken out in the first series of thinnings. A second and even a third series will have to be made to give free room, both in the soil and in the atmosphere, to the young crop, which will consist of whatever advance growth there is already on the ground, together with the seedlings and coppice shoots that may come up in the meantime. These thinnings need not be so close or as careful as those executed in the Ránikhet reserve. We can never bring the forests in question up to their maximum productiveness, unless they are reserved and placed under the exclusive control of the forest officer, and we can only adapt our means to the end attainable. The time available for completely regenerating any area being only 20 years, the utmost encouragement must be given to the advance growth to push on and get up beyond the liability of direct injury by cattle ; but, on the other hand, the opposite extreme of opening out the crop too much must be avoided, for the resulting condition of the forest would in that case be worse than their present plight, which we are now trying to ameliorate. Low, scrubby coppice, knotty or hidebound or standing on gnarled stools, should be cut back.

The entire area taken up should be worked over in the very year in which it is closed or, if judged necessary, just before a good seed-year, and each such area should be gone through again every six years.

After felling in the closed areas, the balance of the firewood-demand on these forests, which demand, at first very large, would go on diminishing in progress of time as the productiveness of the Ránikhet Reserve increased, should be obtained by means of improvement thinnings or jardinage fellings from the better portions outside. No doubt a less or more considerable proportion of it would be obtained from the refuse of the villagers' fellings.

It would be extremely unadvisable to restrict the freedom of the divisional officer by laying down a detailed plan of operations for each forest. Under the circumstance of the closing he will not be able to help working in each one of the forests almost every year, and it will be most profitable in every respect to leave to his discretion whence to supply the requisitions of the villagers and to obtain the balance of the commissariat fuel demand, so long as he does not exceed the quota of exploitable material as estimated on page 203.

Section IV.—Exploitation of Minor Produce.

In the reserve this should be carried on as hitherto. In the protected forests the right-holders should be allowed to cut grass in the closed portions, whence they may also be allowed to remove, under close supervision, some portion of the layer of fallen pine needles, when they lie too thick for the production of seedlings.

Grazing and lopping will, of course, continue as at present in the open areas, but no effort should be spared to induce the villagers to restrict the latter practice, in the same manner as has already been so successfully done at Naini Tal.

CHAPTER V.—FINANCIAL FORECAST.

The figures given in the statement on page 25 represent the average rates of cutting up and delivering firewood from the several forests, supposing an equal quantity to come out of every portion of each forest. But during the 40 years for which the general provisions of this working plan have been framed, only the most accessible areas will be worked for commissariat fuel, for after the expiry of that period the entire supply will be obtainable, as will be observed from the following chapter, from the less remote forests, *viz.*, the Reserve, Chiláná, Ganiadeoli, the Chaubattias, and the western half of Padholi. Hence the lower rates adopted in the subjoined estimate of the cost of fuel operations during the first period.

Name of forest.	Number of maunds of firewood obtained.	Cost of preparing and delivering 100 maunds.	Total cost.
		Rs.	Rs.
Reserved forest, Block I.	394,000	14	55,160
Ditto ditto II. and III.	395,000	15	59,250
Ditto ditto IV.	255,000	18	45,900
Chaubattia west	55,000	15	8,250
Ditto east	161,000	15	23,150
Chiliánáo	150,000	14	21,000
Padholi	70,000	18½	12,950
Ganiádeoli	140,000	11½	16,100
Kathálekh	300,000	22	66,000
Dwársaon	50,000	17	8,500
Kárchúli	30,000	24	7,200
Siun	50,000	31½	15,750
Sauní (on map Siuni)	510,000	27	1,37,700
Total ...	2,560,000	...	4,76,910

The more distant forests, *viz.*, Kathálekh, Dwársaon, Kárchúli, Siun and Sauni, are made to contribute towards the commissariat supply only a portion of their yield.

We are now in a position to forecast the financial results that may be expected during the first 40-year period :—

Revenue.	Amount.	Expenditure.	Amount.
	Rs. a. p.		Rs. a. p.
2,560,000 maunds firewood at Rs. 44 per 100 maunds.	11,26,400 0 0	Cost of preparing and delivering 2,560,000 maunds firewood as per preceding statement.	4,77,000 0 0
Grass	28,000 0 0	Fire conservancy	28,000 0 0
Timber and minor produce other than grass.	80,000 0 0	Protective and office establishments.	1,00,000 0 0
		Half divisional officer's salary and allowances.	1,70,000 0 0
		One-twelfth direction charges ...	80,000 0 0
		Roads, buildings and other works.	16,000 0 0
		Tools and plant	8,000 0 0
		Cultural operations ...	20,000 0 0
		Add for contingencies, Rs. 5 per cent. of above.	45,000 0 0
		Surplus	2,90,400 0 0
Total ...	12,34,400 0 0	Total ...	12,34,400 0 0

This gives an average annual surplus of Rs. 7,200, or upwards of Rs. 4,000 more than the average annual surplus during the past 10 years, although a large provision has been made for increased strength of establishments and more intensive treatment. Moreover, no allowance has been made for an enhanced revenue from the sale of timber and charcoal, although a far from inconsiderable improvement is certain to occur in a few years.

CHAPTER VI.—FORECAST OF FUTURE CONDITION OF THE STOCK.

This forecast cannot be profitably made for the close of the sub-period of 10 years only, the growth of the trees being too slow to show any well marked changes in so short a time. To make it for the close of the first period of 40 years would, on the other hand, not only be easily feasible, but have the advantage of showing to what end the various proposals suggested in the preceding chapters tend.

In 40 years all the trees at present 5′ 2″ and upwards will have disappeared, so that the average tree that will then be felled will not have so large a diameter as the average exploitable tree now. On the other hand, the trees that will be left will be all the growing and healthy ones that now compose the stock, and will therefore, girth for girth, compared with those that will have disappeared, contain more material. Lastly, the present first and second girth classes will have ceased to exist, and their place will be taken by trees respectively above 5′ 2″, and from 4′ 6″ to 5′ 2″ in girth. The preceding remarks apply more specially to the reserve: in the protected forests the trees, class for class, will necessarily be less bulky.

In the second of the following three statements the weight of the utilizable material assumed in the average tree of each class and species is—

Girth-class.	*I.*	*II.*	*III.*	*IV.*	
Chír.	50	40	20	6	100lb. maunds.
Oaks	35	20	10	3	ditto.
Other species	15	10	5	2	ditto.

In the first statement the figures adopted are the same as hitherto employed.

The numbers of the trees in the first, second, and third classes are respectively the balance of the trees forming the present second, third, and fourth classes. The numbers for the fourth class in the forecast have been assumed on the basis of the present state of the advance growth and the prevailing conditions of soil and locality.

Estimate of stock in the Reserved Forest at close of first 40-year period.

Species.	Girth-class.	Block I.		Block II.		Block III.		Block IV.		Total.	
		Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.
Chír ..	I.	...	...	5,485	274,250	2,981	149,050	2,642	132,100	11,108	555,400
	II	6,600	264,000	6,900	276,000	4,300	172,000	6,200	248,000	24,000	960,000
	III.	9,000	180,000	8,800	176,000	5,500	110,000	8,700	174,000	32,000	640,000
	IV.	81,000	486,000	50,000	300,000	15,000	90,000	12,000	72,000	158,000	948,000
Total ...	...	96,600	930,000	71,185	1,026,250	27,781	521,050	29,542	626,100	225,108	3,103,400
Oaks ...	I.	396	17,820	910	40,950	1,029	46,305	1,172	52,740	3,507	157,815
	II.	600	18,000	1,550	46,500	1,300	39,000	1,350	40,500	4,800	144,000
	III.	700	8,400	2,320	27,840	1,920	23,040	2,060	24,720	7,000	84,000
	IV.	3,000	12,000	6,000	24,000	4,000	16,000	6,000	24,000	19,000	76,000
Total ...	...	4,696	56,220	10,780	139,290	8,249	124,345	10,582	141,960	34,307	461,815
Other species,	I.	77	1,925	245	6,125	1,161	29,025	1,057	26,425	2,540	63,500
	II.	600	9,000	1,010	15,150	3,850	57,750	3,340	50,100	8,800	132,000
	III.	1,100	8,800	1,660	13,280	6,600	52,800	5,840	46,720	15,200	121,600
	IV.	4,000	8,000	7,000	14,000	10,000	20,000	10,000	20,000	31,000	62,000
Total ...	...	5,777	27,725	9,915	48,555	21,611	159,575	20,237	143,245	57,540	379,100
Grand Total,	...	107,073	1,013,945	91,880	1,214,093	57,641	804,970	60,361	911,305	316,955	3,944,315

Estimate of stock in protected forests at close of first 40 year period.

Species.	Girth-class.	Sauni.		Siun.		Kathálekh.		Ganiádeoli.		Chiliánáo.		Kárchuli.		Padholi.		Dwársaon.		Chaubattia West.		Chaubattia East.		Total.	
		Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.
Chír ...	I.	4,832	241,600	604	30,200	3,337	166,850	2,139	106,950	987	49,350	575	28,750	1,287	64,350	729	36,450	506	25,300	1,449	72,450	16,445	822,250
	II.	20,312	812,480	3,393	135,720	16,831	673,240	7,627	305,080	4,238	169,520	1,119	44,760	4,415	176,600	2,150	86,000	1,840	73,600	5,591	223,640	67,516	2,700,640
	III.	93,094	1,861,880	8,630	172,600	39,404	788,080	9,429	188,580	21,124	422,480	4,201	84,020	26,640	532,800	28,564	571,280	3,930	78,600	12,520	250,400	247,536	4,950,720
	IV.	300,000	1,800,000	20,000	120,000	90,000	540,000	20,000	120,000	50,000	300,000	20,000	120,000	100,000	600,000	100,000	600,000	8,000	48,000	30,000	180,000	738,000	4,428,000
Total ...	...	418,238	4,715,960	32,627	458,520	149,572	2,168,170	39,195	720,610	76,349	941,350	25,895	277,530	132,342	1,373,750	131,443	1,293,730	14,276	225,500	49,560	726,490	1,069,497	12,901,610
Oaks ...	I.	7,802	273,070	1,832	64,120	384	13,440	6	210	...	...	...	...	71	2,485	1,074	37,590	289	10,115	958	33,530	12,416	434,560
	II.	14,877	297,540	3,592	71,840	1,445	28,900	42	840	5	100	...	...	316	6,320	3,354	67,080	1,047	20,940	3,260	65,200	27,938	558,760
	III.	31,071	310,710	5,421	54,210	2,890	28,900	114	1,140	23	230	1	10	875	8,750	8,934	89,340	887	8,870	8,099	80,990	58,315	583,150
	IV.	60,000	180,000	10,000	30,000	6,000	18,000	500	1,500	100	300	50	150	2,000	6,000	20,000	60,000	1,000	3,000	20,000	60,000	119,650	358,950
Total ...	...	113,750	1,061,320	20,845	220,170	10,719	89,240	662	3,690	128	630	51	160	3,262	23,555	33,362	254,010	3,223	42,925	32,317	239,720	218,319	1,935,420
Other species,	I.	2,291	34,365	542	8,130	148	2,220	5	75	2	30	...	...	43	645	269	4,035	70	1,050	408	6,120	3,778	56,670
	II.	7,516	75,160	1,367	13,670	1,169	11,690	60	600	30	300	6	60	286	2,860	1,540	15,400	181	1,810	1,629	16,290	13,784	137,840
	III.	42,887	214,435	8,936	44,680	5,246	26,230	212	1,060	940	4,700	44	220	2,938	14,690	6,287	31,435	578	2,890	9,455	47,275	77,523	387,615
	IV.	60,000	120,000	20,000	40,000	10,000	20,000	500	1,000	3,000	6,000	200	400	8,000	16,000	10,000	20,000	1,000	2,000	20,000	40,000	132,700	265,400
Total ...	...	112,694	443,960	30,845	106,480	16,563	60,140	777	2,735	3,972	11,030	250	680	11,267	34,195	18,096	70,870	1,829	7,750	31,492	109,685	227,785	847,525
Grand Total,	...	644,682	6,221,240	84,317	785,170	176,854	2,317,550	40,634	727,035	80,449	953,010	26,196	278,370	146,871	1,431,500	182,901	1,618,610	19,328	276,175	113,369	1,075,895	1,515,661	15,684,555

In the subjoined table a forecast is attempted of the probable yield of commissariat firewood from the reserved forest during the second 40-year period :—

Produce available from Reserve in 2nd period.

Species.	Girth-class.	Percentage to come out.	Number		Number of maunds in each tree.	Remarks.
			Of trees.	Of maunds.		
Chír ...	I.	...	11,108	555,400	50	Yield per annum nearly 44,000 maunds as opposed to only 26,000 maunds during the first period.
	II.	20	4,800	192,000	40	
	III.	30	9,600	192,000	20	
	IV.	40	63,200	379,200	6	
Total ...	...	...	88,708	1,318,600		
Oaks ...	I.	...	3,507	157,815	45	
	II.	20	960	28,800	30	
	III.	30	2,100	25,200	12	
	IV.	35	6,650	26,600	4	
Total ...	...	...	13,317	238,415		
Other species...	I.	...	2,540	63,500	25	
	II.	30	2,640	39,600	15	
	III.	40	6,080	48,640	8	
	IV.	50	15,500	31,000	2	
Total ...	...	...	26,760	182,740		
GRAND TOTAL...	...	...	128,785	1,739,755		

CHAPTER VII.—PROPOSED SCRUTINY AND REVISION OF WORKING PLAN AT THE CLOSE OF THE FIRST 10-YEAR SUB-PERIOD.

In order to render this scrutiny and revision possible, data will have to be collected by the divisional officer as a check on those on which the present working proposals are based.

In the absence of a superior officer or trained subordinate resident at Ránikhet, the data to be collected should be of the simplest character.

The following suggestions are made :—

(1) Every year 10 trees, of average growth, of each of the following girths should be cut up, and measured and weighed separately :—

I.—5′ 6″ being average girth of trees above 5′ 2″ in girth.
II.—4′ 9″ ditto ditto 4′ 6″ and up to 5′ 2″ in girth.
III.—3′ 9″ ditto ditto 3′ ditto 4′ 6″ „
IV.—2′ 3″ ditto ditto 1′ 6″ ditto 3′ „
V.—1′ 1″ ditto ditto 8″ ditto 1′ 6″ „

The weights will of course be recorded, and the following species or groups of species will be treated separately :—

(i) Chír, (ii) Oaks, (iii) Buráns, (iv) Other species.

(2) Every year the number of concentric rings on 10 chír stumps will be counted and recorded in the manner described on pages 9-10.

(3) Check of the descriptions of the compartments as they come under working and careful noting of any corrections rendered necessary by the progressive growth of the crop.

The above data will of course be additional to those that must be submitted every year in the statements prescribed by the Forest Department Code.

E. E. FERNANDEZ,
Offg. Dy. Director, Forest School.

APPENDIX.

Summary of the Working Plan.

Standing Stock by girth-classes and species.

		Ránikhet Reserve.		The Protected Forests.		Total.	
		Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.	Number of trees.	Yield in maunds.
Chír	I. ...	2,066	154,950	12,159	911,925	14,225	1,066,875
	II. ...	22,408	1,008,360	32,545	1,464,525	54,953	2,472,885
	III. ...	32,000	640,000	87,766	1,755,320	119,766	2,395,320
	IV. ...	42,000	336,000	332,836	2,662,688	374,836	2,998,688
Total ...	...	98,474	2,139,310	465,306	6,794,458	563,780	8,933,768
Oaks	I. ...	1,148	82,656	11,163	803,736	12,311	886,392
	II. ...	4,407	92,547	15,484	325,164	19,891	417,711
	III. ...	6,000	54,000	34,719	312,471	40,719	366,471
	IV. ...	9,000	27,000	81,155	243,465	90,155	270,465
Total ...	...	20,555	256,203	142,521	1,684,836	163,076	1,941,039
Other species ...	I. ...	148	4,440	1,866	55,980	2,014	60,420
	II. ...	3,040	42,560	5,812	81,368	8,852	123,928
	III. ...	10,000	80,000	21,184	169,472	31,184	249,472
	IV. ...	17,000	34,000	108,723	217,446	125,723	251,446
Total ...	...	30,188	161,000	137,585	524,266	167,773	685,266
Grand Total ...	...	149,217	2,556,513	745,412	8,903,560	894,629	11,560,073

Quantity of fuel exploitable during the 40 years.

This calculated from the preceding table as follows :—

	I.	II.	III.	IV.	
Chír	All	50	25	30	per cent.
Oaks	All	20	20	30	"
Other species	All	40	30	30	"

The result is tabulated below, where also deduction is made for trees required by right-holders from the protected forests :—

Species.	Girth-class.	Ránikhet Reserve.		Protected Forests.				Total Available.	
		Number of trees.	Yield in maunds.	Number of trees exploitable.	Number of trees required by villagers.	Number of trees available.	Number of maunds available.	Number of trees.	Yield of maunds.
Chír	I. ...	2,066	154,950	12,159	...	12,159	911,925	14,225	1,066,875
	II. ...	11,300	508,500	16,100	12,060	4,040	181,800	15,340	690,300
	III. ...	8,000	160,000	20,250	8,530	11,720	234,400	19,720	394,400
	IV. ...	10,000	80,000	85,300	71,880	13,420	107,360	23,420	187,360
Total ...	...	31,366	908,450	133,809	92,470	41,339	1,435,485	72,705	2,338,935
Oaks	I. ...	1,148	82,656	11,163	...	11,163	803,736	12,311	886,392
	II. ...	900	18,900	3,068	900	2,168	45,528	3,068	64,428
	III. ...	1,200	10,800	6,781	5,510	1,271	11,439	2,471	22,239
	IV. ...	2,000	6,000	22,840	9,270	13,570	40,710	15,570	46,710
Total ...	...	5,248	118,356	43,852	15,680	28,172	901,413	33,420	1,019,769
Other species ...	I. ...	148	4,440	1,866	...	1,866	55,980	2,014	60,420
	II. ...	500	7,000	2,034	40	1,994	27,916	2,494	34,916
	III. ...	1,200	9,600	7,400	800	6,600	52,800	7,800	62,400
	IV. ...	1,800	3,600	31,200	...	31,200	62,400	33,000	66,000
Total ...	...	3,648	24,640	42,500	840	41,660	199,096	45,308	223,736
Grand Total ...	...	40,262	1,046,446	220,161	108,990	111,171	2,535,994	151,433	3,582,400

Average annual commissariat requirements—64,000 maunds. There will be, therefore, a balance of 1,000,000 maunds available for sale to other purchasers.

PROPOSALS FOR THE NEXT TEN YEARS.

Reserve.

Regeneration thinnings over $\frac{1}{10}$ area of block I. every year, treating each area on its own merits. Hence yield from year to year will fluctuate, but the average will be about 12,000 maunds per annum, leaving a balance of 13,000 maunds to be obtained by means of jardinage fellings in the other three blocks.

Protected Forests.

Close one-eighth of total area to grazing and lopping, and in the portion thus closed make regeneration thinnings; elsewhere jardinage fellings. Combined yield of the two series of fellings=39,000 maunds.

Forecast of stock at the close of 40 years.

This cannot be abridged from Chapter VI., the contents of which can be grasped in a few minutes' reading.*

E. E. FERNANDEZ,
Offg. Dy. Director, Forest School.

No. 633, dated 19th February, 1887.

From—C. BAGSHAWE, ESQ., *Officiating Conservator of Forests, Central Circle, North-Western Provinces and Oudh,*

To—*The Inspector-General of Forests to Government of India, Calcutta.*

SIR,—In accordance with Government of India, Home Department, Circular Nos. 21F., dated 6th December, 1884, and 3F., dated 21st April, 1886, respectively, I have the honour to forward two copies of a working plan (illustrated by 10 sheets of the 4″ forest map) for the Ránikhet forests, by Mr. E. E. Fernandez, Officiating Deputy Director of the Forest School.

2. As stated in the introduction to the report, the proposed provisions of the working plan were approved of by Mr. Greig before he proceeded on furlough, and only a few notes on my part seem called for.

3. The report is divided into four portions :—

1st.—26 pages of general account of the forest, pages 1 to 26.

2nd.—171 pages of detailed accounts of compartments, pages 27 to 197.

3rd.—15 pages embodying organization scheme or working plan, pages 198 to 212.

4th.—1½ pages of summary of the above drawn up at Mr. Greig's request, and it deals most thoroughly with all questions connected with the Ránikhet forests.

4. The working plan and the question of how the cantonments can be supplied with fuel and the rights of villagers be met, may be said to hinge on the possibility of closing to grazing in rotation ⅛th of the area of (protected) forest open to rights, *vide* pages 200 and 201 of the report.

At present about $\frac{1}{11}$th of the forest is closed to grazing, and though it will be possible to raise this area to ⅛th, I cannot, at present, as the existing closed area is generally furthest from the right holding villages, express an opinion as to the possibility of opening this area in due course and substituting other areas in its place.

* This précis has been prepared in accordance with Mr. Greig's instructions.

As to the necessity of working the forest open to rights by this or some similar method, there can be no doubt, but it is necessary that this fact should be generally recognized and the hands of the forest department strengthened before it can be carried into practice.

It is a matter for regret that the point has not been definitely mooted during the five years the working plan has been under preparation, so that definite propositions might have been submitted for consideration by the local authorities.

5. Apart from the system of rotation in its entirety referred to in paragraph 4, the provisions of the working plan will, pending sanction, be introduced during the present year.

No. 406, Simla, the 16th June, 1887.

From—B. RIBBENTROP, ESQ., *Offg. Inspr.-Genl. of Forests to the Govt. of India,*

To—*The Secy. to the Govt., N.-W. P. and Oudh, Rev. (Forests) Dept.*

SIR,—With reference to paragraph 8 of the Circular Resolution of the Government of India, in the Home Department, No. 21F., dated the 6th December, 1884, I have the honor to forward, for submission to His Honor the Lieutenant-Governor, a copy of the working plan for the Ránikhet forests in the Central Circle, by Mr. E. E. Fernandez, Officiating Deputy Director of the Dehra Forest School, together with a copy of the Conservator's forwarding letter,* and of a Note† by the Assistant Inspector-General of Forests and Superintendent of working plans.

* No. 633, dated 19th February, 1887.
† Dated 22nd March, 1887.

2. I agree generally with the Note on this working plan by the Assistant Inspector-General, and it is unnecessary, therefore, that I should refer to the plan at any great length.

In most respects, I should have considered the working plan an excellent one, provided always the protected forests and everything relating to their management had been excluded, or had been separately treated of in the form of an appendix. Parts I and II of the report are particularly good, and the subject-matters well arranged; and the entire work gives evidence of much intelligent labour and study of local conditions.

3. Mr. Fernandez's instructions were, I presume, to frame working plans for the entire area of the Ránikhet forests. But a working plan can only be constructed for forests in respect of which the will of the owner, as regards the use of the property, has been previously ascertained. It is evident that, without any certain knowledge of the intentions of the Local Government with reference to the participation of the surrounding population in the produce of these protected forests, the working plans' officer could only grope about in the dark, and that his work must, under the circumstances, reduce itself to a series of disjointed proposals; and such has been the case in the present instance. Mr. Fernandez should, I submit, have here, in the first place, ascertained the definite intentions of Government, and, in union with Government, have arranged for such a permanent settlement of existing rights, and practical regulation of necessary concessions, as could enable him to frame a working plan for these protected forests on a sound and workable basis. But he does not appear to have done anything of the kind.

4. I recommend that Mr. Fernandez's plan for the reserved forest be accepted, but that the constituted conditions of the other forests be so modified (by settling existing rights, and restricting concessions within limits compatible with a systematic working of the forests) as to make a working plan for them *practicable on ordinary economic principles of forestry.* In connection with such a solution, Mr. Fernandez proposes, among other things, that the area of the

protected forests should be progressively closed to grazing in the proportion of $\frac{1}{160}$th of the total area per annum, for a period, in each case, of 20 years. This is equal to an eventual closing of $\frac{1}{8}$th of the total area. In my opinion, this proportion is too small. In Germany, the law sanctions the closure of $\frac{1}{4}$th of the area of all fir forests subject to grazing rights. It is within the power of the Local Government to do the same under section 14 of the Forest Act, and I think it might do so with advantage, closing at once a quarter of the total area of each forest for a period of 20 years, and, at the expiration of that time, opening this closed tract to pasture, in the gradual yearly ratio of from $\frac{1}{20}$th to $\frac{5}{20}$ths of its area, according to the progress made in the meantime by the young growth, an equivalent area of the hitherto open forest being, at the same time, closed. By at once closing a quarter of the total area, in each case, a nucleus is secured, whereas by only closing $\frac{1}{160}$ths to $\frac{2}{160}$ths, as proposed by Mr. Fernandez, no provision whatever is made for accidents, apart from which it would be found difficult to work the scheme.

No. 407.

COPY, with copy of the Assistant Inspector-General's Note referred to, forwarded for information, to the Conservator of Forests, Central Circle, North-Western Provinces and Oudh, with reference to his letter No. 633 of the 19th February last.

B. RIBBENTROP,
Offg. Inspector-General of Forests.

Note on MR. FERNANDEZ'S *working plan of the Ránikhet forests, in the Central Circle, North-Western Provinces; by the Assistant Inspector-General of Forests and Superintendent of Working Plans.*

The field-work in connection with this working plan was completed early in 1882; but, owing to press of other work, was not utilized for the purposes of this plan, until April, 1886, when, as a necessary consequence of so much delay, most of the computations had to be done over again, trees having, in the meantime, been felled in nearly every one of the numerous compartments into which the forests had been divided.

2. These Ránikhet forests are 11 in number and comprise a total area of about 27 square miles, of which the so-called Ránikhet reserve constitutes something short of 8 square miles.

3. In the case of each of these forests, the number of the trees was ascertained by means of a complete enumeration survey. But here this difference has to be noted that the valuation of the stock in the case of the reserve was not effected at the same time with the rest of the survey. The former was made as long ago as 1878-79 by Mr. Brereton, and in accordance with a classification different in every way from that adopted by Mr. Fernandez in his operations of 1882. Mr. Fernandez has, notwithstanding, used Mr. Brereton's figures, with certain modifications. The girth-classes employed by the latter were—

Class I	...	...	...	Girth above 8 feet.
„ II	...	..	...	„ „ 6 „ and up to 8 feet.
„ III	...	..	...	„ „ 4 „ „ „ 6 „
„ IV	...	...	...	„ „ 2 „ „ „ 4 „

and those employed by Mr. Fernandez in his survey—

Class I	...	...	...	Girth above 6 feet.
„ II	...	...	...	„ „ 4 ft. 6 in. and up to 6 feet.
„ III	...	...	...	„ „ 3 ft. „ „ 4 ft. 6 in.
„ IV	...	...	...	„ „ 1t. 6 in. „ „ 3 feet.

Mr. Brereton's two highest classes were obviously included by Mr. Fernandez in his own I class. But he acted wrongly, in my opinion, when he treated Mr. Brereton's III class, without any alteration, as his own II. class. Mr. Brereton's class, having the wider range of 2 feet, as opposed to Mr. Fernandez's 1½ feet, evidently contained many more trees. To this Mr. Fernandez replies that—

This must be pointed out.
B. R.

"No great error can arise from the procedure; for eight years having elapsed since the survey in question was made, the number of the ordinary first class trees has necessarily increased, and many of the trees that were originally not more than 4′ 6″ in girth have obviously now entered the ordinary second class; so that, although the actual number of trees of this latter class may not be so large as that adopted, the increase in the first class, which has not been allowed for, will effect the necessary compensation."

Mr. Fernandez appears here to lose sight of the fact that, in the meantime, the trees of the younger classes have not remained idle, and that, for every tree that has thus entered the limits of the ordinary first class, at least three have entered the limits of Mr. Brereton's third class. I do not pretend to say that there are more trees in that class (third class) now, because nature has also, in the meanwhile, been at work, and has thinned out that portion of the stock; but I do maintain that the number of trees in Mr. Brereton's third class is most probably the same as of yore; in other words, that Mr. Fernandez has, on this basis, allowed too many trees to his II class. In reference to his III and IV classes, Mr. Fernandez acknowledges himself that his estimates for the reserve are here founded a good deal on guess-work, since Mr. Brereton's valuation survey did not extend below a girth of 2 feet.

4. Mr. Fernandez has, I think, rightly chosen for these forests the rotation which will secure the largest possible annual yield of sound wood, the main object being here to obtain the largest supply of fuel. This rotation corresponds with the highest mean annual increment of growth. Chír (*Pinus longifolia*) and bánj (*Quercus incana*) are the only two species of importance met with in the working circle, and the former has alone been considered in the choice of a rotation, the growth of the oak not having been ascertainable, and its distribution being, moreover, limited. From calculations made of the volume contained in some 100 chír trees of varying age, Mr. Fernandez has, in the present instance, determined the highest mean annual increment of growth in that species to be 0·59 cubic feet, corresponding with an age of 162 years, and a girth, breast-high, of 5′ 2″. He has accordingly fixed his rotation at 160 years, a period of time which, he says, "will furnish not only more fuel trees, but also trees large enough for all descriptions of beams and scantlings." What Mr. Fernandez here observes is not very consistent with what he writes in connection with this same important point in his working plan for the Naini Tal forests, *viz.*, "The amount of waste in converting trees of only 5′ girth is disproportionately large * *." But evidently these Ránikhet chír forests are principally required for the supply of fuel, and it should always be possible to meet the demands for timber by maintaining in the nearer blocks a sufficiency of reserve chír trees of good promise, which could then be permitted to reach the exceptional dimensions required. But no provision of the kind is made by Mr. Fernandez.

5. My only objection to this rotation is that it results from calculations in which Mr. Fernandez himself has apparently no great faith. At page 9 of his report he writes, in reference to the growth of chír,—"That species is so apt to form spurious or incomplete rings, that in a tree of moderate size the number of rings visible on one radius may differ from that on another by as many as 20 and even more." Mr. Fernandez did his best to minimise the resulting error by taking into account only such concentric rings as appeared on a radius presenting the least number of such rings. But it is evident, as Mr. Fernandez says, that even these last rings may, in many instances, have also been spurious ones. The very slow growth

which he has obtained for chír, the advanced age (something under 400 years) to which he makes it arrive, without any correspondingly large girth—and that in a by no means Alpine region—are circumstances tending to show that he has probably ascribed to this species a too slow development. Conditions are, of course, very different in the Dehra Dún, where large chír trees of five feet in girth are known not to be much over 70 years of age, if so much; but the very great disparity of the results obtained by this ring counting—see pages 9-10—necessarily lends strength to the supposition that the present data are not sufficiently reliable. For instance, on the first inch of radius, we find the rings as many as 18 and as few as 2; while on the succeeding inch sections of the radius we observe the following extremes in this respect:—

		Maximum.	Minimum.
	2nd inch	23	3
	3rd "	28	3
	4th "	32	3
	5th "	30	4
	6th "	33	6
Difference probably caused by fires.	7th "	37	4
B. R.	8th "	42	3
	9th "	47	6
	10th "	44	9
	11th "	47	12
	12th "	40	11
	13th "	43	11
	14th "	49	14
	15th "	45	25

These extremes, if added up, correspond with two trees of the same girth (*viz.*, 8′6″), but having the following extraordinary difference in age, *viz.*, 540 years and 114 years, respectively.

And if we only take account of the first nine inches of radius, we deduce still more significant results, *viz.*:—

Girth 4′9″	
Maximum age	272
Minimum "	32
Difference ...	140 years.

6. The computations of volume in the case of oak and other miscellaneous species are admittedly based on insufficient data. Altogether, only 32 trees were cut up and measured—11 trees to represent a total estimated stock of 163,000 oak trees, and 21 trees to represent the 168,000 trees belonging to various miscellaneous species. To understand how inadequate these tests are, it must be borne in mind that the oaks alone represent one-fifth of the total stock, and the miscellaneous species another one-fifth; also that the dimensions attained to in these forests by oaks, rhododendrons and ayar vary in the most extraordinary manner, so much so, in fact, that nothing reliable could be expected from less than 100 trees of each of the above three species.

7. Part I of the report, besides dealing with most of the foregoing matters, contains most useful and varied information regarding the administrative conditions of the forest, the topography and climate of the locality, the soil, the general character of the stock, the relation of demand to supply, past working, and the financial position of the forests.

8. Part II deals exclusively with the stock. In it, each forest has been taken up *seriatim*, and described at first generally, and then in detail by compartments. To each such description has been appended a tabular statement showing the contents in a condensed form; and useful facts connected with the rights of the surrounding populations also find a place in the general description of the several forests consti-

tuting the working circles. Although it is not well understood what Mr. Fernandez means by a quality of stock indicated by 2 as opposed to a quality indicated by 3 or 9 ; or what number of trees to the acre 10 is intended to illustrate ; although, moreover, it is impossible for us to place reliance in the volumes given for any other than the chír trees, this part of the report deserves nothing but praise for the intelligent labour with which the data have been worked out and arranged.

These figures must not be tolerated in a working plan.

B. R.

9. Part III of Mr. Fernandez's report treats of the working plan proper, which he calls the Organization Scheme. The improvement of the boundaries is, of course, a subject of great importance, and one which would appear to have been singularly neglected by previous officers in charge of the Ránikhet forests ; but it should more properly have found a place in the plan of operations for the first period of the rotation, and not in the introductory chapter to the " Organization Scheme," with which it has nothing special to do. Of the exploitability and rotation I have already treated.

10. Mr. Fernandez has, I think, correctly concluded—I am well acquainted with these forests myself—that our aim should be, in the case of these Ránikhet chír forests, to bring them as much as possible into a regular condition as regards the gradation of the age-classes. In the present circumstances of these forests, the so-called Ránikhet reserve, is however, the only tract that can be treated in this special way. The other forests being merely protected forests in that definition of the Act, and burdened with impracticable concessions, if not rights, are, for the present at least, not ripe for any other method of working than that of a careful Jardinage.

Certainly.

B. R.

11. Mr. Fernandez accordingly divides these forests into two distinct working circles—

1. The Ránikhet reserve.
2. The protected forests.

12. The Ránikhet reserve he divides into four blocks to correspond with his four great divisions of the rotation, *viz.* :—

1st division.—The period of 40 years required by the II class trees to attain to 5′ in girth.

2nd division—The period of 40 years required by the III class trees to become II class trees.

3rd division.—The period of 40 years required by the IV class trees to become III class trees.

4th division.—The period of 40 years required by the young seedlings to become IV class trees.

But, while all these four blocks would appear to have existed previous to Mr. Fernandez's survey, their constitution has not been justified by him in any other sense than the above. Their areas are not equal, neither do they contain equivalent resources in mature timber. We are not even told that, under a systematic management, they will hereafter include equivalent resources.

13. It is proposed by Mr. Fernandez to regularize each of the above blocks in succession during the next 160 years, beginning with block I, and ending with block IV. The regularization is to occupy, in each instance, a period of 40 years during which time the block subjected to this process would be gradually emptied of all the 1st and 2nd class chír trees, by means of progressive annual regeneration thinnings over $\frac{1}{10}$th of the entire area of the block, and repeated three times, in each case, during the period of 40 years. Such quota of the annual yield as would not be

met by those operations it is proposed to obtain from jardinage fellings in the remaining three blocks, and from thinning out poles where this form of improvement is desirable.

14. The annual yield itself is, of course, only calculated for the next 40 years, and is arrived at, in great part from a series of deductions founded on pure observation. Mr. Fernandez includes in the yield of the 40 years period for the Ránikhet reserve—

It could not well be otherwise. B. R.

(a) all chír trees of 5 feet in girth and upwards ; and he *assumes* half of the II class chír trees to be thus situated, in addition to those in the I class:

(b) All I class trees of other species ;

(c) 20 per cent. of all II class oak trees, and 40 per cent. of all II class trees other than oak and chír ;

(d) 25 per cent. of all III class chír trees, 20 per cent. of all III class oak trees, and 40 per cent. of all III class trees other than chír or oak ;

(e) 30 per cent. of IV class trees of all kinds.

Remarking on the absence of any apparent *raison d' être* for most of the above figures, Mr. Fernandez says: "they are based on a careful study of the present stock and its peculiar surroundings." I think we may agree that, under the circumstances of the case, no other course was open to the working plans officer than that here pursued. Working plans of the present description must necessarily found themselves to a great extent on the results of observation and previous experience ; and their usefulness must, in the same way, a good deal depend on the degree of attention with which their practical execution is scrutinized, and on the application of such periodical corrections as this continuous check implies.

15. I have indicated that Mr. Fernandez contemplates felling, in the block under regularization, *all* the II class chír trees within the period of 40 years corresponding to it. The result of this excess felling of II class chír trees in the block under regularization is that corresponding reductions are rendered necessary in the exploitation of the same class of chír in the blocks subject to jardinage ; and such being the case, and bearing well in mind the very useful transformation in view, we can have no objection to the arrangement, the less so that these reductions will for the present take place where fellings are least necessary, and *vice versâ*.

16. In a tabular form Mr. Fernandez then proceeds to condense all the necessary information in regard to the number of trees of kinds, and the volume of material which the reserve should be made to yield during the first 40 years—

(a) from the block under regularization ;

(b) from the three other blocks under jardinage.

17. We now naturally look about us for the "Plan of Operations" for the first 10 years of this 40-year period. Seeing on what a large scale the report has, up to the present, been written, the minute details that have never been neglected, seeing more than anything else the difficulties and the immense importance attaching to this regularization scheme, we anticipate something proportionately elaborate and carefully considered in the shape of that "vade mecum" of the executive forest officer—the plan of operations from which he must not depart, without showing good cause, during, say, the next 10 years. But practically speaking, Mr. Fernandez's report contains no plan of operations. He gives an outline of policy, but no more.

Yes, here he fails. B. R.

18. That outline of policy is a good one ; but still the executive forest officer is left without any sufficient guidance. An officer equally familiar with his

profession and with these forests would, of course, find no difficulty in pursuing the correct course at any time, as dictated by the real requirements of the stock ; but while, even then, it is desirable not to leave too much to his discretion, it is only too possible that the said officer may be a comparative stranger, or an unintelligent officer, or may combine both drawbacks. Without a detailed plan of operations a working plan loses very much of its value.

19. A plan of operations would, besides indicating the progress of principal and subordinate (thinnings) fellings, compartment by compartment, arrange for all necessary or desirable improvements to the stock, to communications, buildings, &c., &c. ; but although more planting has been done in the Ránikhet forests than anywhere else in the Province, the subject is not even mentioned.

20. Coming now to the protected forests, the annual yield has been calculated in the same way as for the reserve with this difference that the material going to constitute the requirements of the right-holders has been taken into account, and deducted from the total available stock—the balance representing the quantity disposable by Government.

21. The requirements of the right-holders have been based on the statement (given on page 22 of the report) of the material supplied to them during the past five years. And here let it be said once for all that, with the single exception of pasture, the requirements of the villagers have nothing finite about them : they have in no sense been measured or fixed, and are in certain cases—as, for instance, in the case of lopping green oak leaves—destructive to the property. The number of cattle has alone been laid down for each forest, and that number is said to be in all cases far in excess of actual requirements.

Till this is done, no working plan can be made.
B. R.

22. Mr. Fernandez's proposals for these protected forests are of a very general character, and have nothing definite about them. Burdened as these tracts are with all sorts of rights, or equally harassing privileges, antagonistic to all rational working, it was impossible that these proposals could assume any other shape. As the working plans officer pointedly observes :—

Quite right.
B. R.

"If these forests are to be worked and still maintained as forests, their reproduction must be assured. This must be done even if no wood were to be cut out of them except for the use of the villagers ; for the present heavy grazing, with the wholesale lopping of all broad-leaved trees, large or small, old or young, must, in the end, unless the progress of reproduction is rendered more satisfactory, result in the forest deteriorating to such an extent that it will be unable to meet even the bare local requirements."

23. Despairing, as be well might, of securing reproduction over the whole area of these forests by means of jardinage fellings, Mr. Fernandez recommends that tracts in each forest, equivalent to $\frac{1}{160}$th of the total area of such forest, be taken up each year, and closed to cattle for 20 consecutive years, and that such tracts be made subject to more or less regular regeneration thinnings, the rest of the area being, in the meantime kept open as of yore, and worked on as mild a system of jardinage as would be compatible with the actual demand upon their resources.

This is equal to an eventual closing of ¼th of the forest area. The law in Germany closes ¼th of the area of fir forests subject to grazing rights. I think this principal might be adopted here, leaving one-fourth of the area closed for 20 years, and then opening from $\frac{1}{20}$th to $\frac{1}{20}$th of this previously closed area, according to the progress made by the young growth, an equal extent of the forest hitherto open being at the same time closed.
B. R.

24. But Mr. Fernandez would prefer, even to such a system as the preceding, that the Local Government would consider once more the principles laid down in its Public Works Department Resolution, No. 269F.C. of the 26th August, 1871, and which bears evidence of the fact that when Government therein ordered the transfer of these protected forests to the Forest Department, it contemplated the formation of three classes of forest, *viz.* :—

(*a*) to be enclosed with a ring-fence and relieved of all rights and privileges,

(*b*) to be open conditionally to pasturage, and to be constituted only in case a sufficient area of forests of the next class (*c*) could not be formed in any particular case,

(*c*) to consist of a proper "range of jungle" to be altogether set aside for the wants of the villagers in respect of grazing, fuel and timber.

It is not well understood why these wise provisions were never acted upon or why the protected forests should, in consequence, have been permitted to deteriorate into their present condition.

25. The annual demand in timber and fuel on these Ránikhet forests comprises that of the station and that of the surrounding privileged populations, and is made up as follows :—

(*a*)	Fire-wood for the station	...	63,500 mds.
(*b*)	Timber (mostly poles) given free to the villagers	...	3,600 trees.
(*c*)	Fire-wood for the villagers given free of payment	...	quantity not known.
(*d*)	Timber sold to the Public Works Department ...	...	1 tree.
(*e*)	Timber sold to private purchasers	...	229 trees.

Mr. Fernandez nowhere furnishes us with a very plain statement of the total yield of these Ránikhet forests, and of the annual prospective drain upon their resources.

Reducing to maunds, on the basis of the factors supplied by him for such conversions, the estimate of available trees given by him on page 203, we have the total yield of the forests, for the first period of 40 years, represented by 4,974,040 maunds.

Treating in the same way the statement given by him on page 205, we find the total drain during the same period on the part of privileged villagers and right-holders to aggregate 2,210,000 maunds, leaving a balance of 2,764,040 maunds for the supply of all other demands. Granting that the present commissariat fuel requirements (64,000 maunds per annum) will not be exceeded, the above balance reduces itself to 204,040 maunds *which is an exceedingly small margin ;* and this becomes almost a deficit if we take into account the timber required by private purchasers and public departments—and that based on the demands of previous years only.

26. Yet Mr. Fernandez estimates a saving of 1,000,000 maunds. This is accounted for in one sense, by his *ignoring* the village demand altogether when the number of poles required under that head is in excess of the number of poles that he is prepared to fell in any one forest. In this way, Mr. Fernandez chalks out no less than 28,180 trees that would in due course be required in the 40-year period by the village of Sauni, and some 9,000 trees constituting portions of the demand of other villages. This circumstance will itself account for a quantity of some 800,000 maunds.

27. But is Mr. Fernandez right in thus assuming that the villages will go without their requirements ? If poles removable from sylvicultural considerations are not to be obtained, will they not insist on at least being supplied with larger trees ; in which case, the waste being greater, the consumption in volume would probably be proportionately greater also, but certainly not less.

28. On the other hand, there are some errors in Mr. Fernandez's estimate of the total quantity of trees available during the period—see page 203. For instance, the number of chír trees of the IV class in Sauni should have been 37,000 and not 30,000 ; in Dwarson 11,000 and not 7,000 ; in Ránikhet reserve 12,600 and not 10 000 ; and there are numerous other smaller errors, all tending to increase the available stock by some 150,000 maunds.

29. Again, there is an error met with in the statement given by Mr. Fernandez on page 205 in respect of the quantity of exploitable material available after supplying villagers' requirements. Under Sauni, for instance, the volume corresponding to oaks of the II class should have been 45,000 maunds and not 21,000 ; and there are also a few minor errors in this same statement.

30. But, making allowances for an extra 170,000 maunds on these accounts, the margin is still too small for so long a period, when it is borne in mind that no prospective increase of importance enters into this calculation of the demand, which appears throughout to be based on the actuals of past years.

31. Affecting both sides of the question, and in the most important degree, in the possibility—nay even probability—of the average volumes attained to by each class and species of tree having been either much under or much over-estimated ; and the same remark applies to the estimates of exploitable trees for the period.

32. The inference is that the execution of the present plan, in the case of the reserved forests, must be watched with the greatest care, and that results tending to show grave inaccuracy should at once be made use of to modify its prescriptions in the direction indicated. As regards the protected forests, with the material before him, Mr. Fernandez could not be expected to prepare any very certain estimates. In fact, without having followed the grand precept of every working plans officer, which is to first ascertain the will of the owner—here the Local Government—he should not have attempted the impossible task of a working plan at all for the protected forests. A working plan is nothing unless founded on something fixed and certain. On the other hand the Local Government will be able now to understand how thoroughly necessary it is that the resources of the protected forests should be carefully husbanded, the rights of the villagers enquired into and recorded, privileges sparingly conceded, and where possible additional tracts constituted into reserves. If the Local Government will act on these recommendations, there should be no difficulty in utilizing for the purposes of a definite plan, Mr. Fernandez's estimates and suggestions for the protected forests.

No. 583, dated Simla, the 30th July, 1887.

From—B. RIBBENTROP, ESQ., *Offg. Inspr.-Genl. of Forests to the Govt. of India,*

To—*The Secy. to the Govt. of the N.-W. P. and Oudh, Revenue (Forests) Dept.*

SIR,—In continuation of letter No. 406, dated the 16th ultimo, I have the honour to state that I have discussed the objection raised by me as regards the uncertainty of the basis of the working plan for the Ránikhet protected forests with Mr. Fernandez, whom the Government of the North-Western Provinces and Oudh kindly permitted to be deputed for that purpose. Mr. Fernandez explains that there is really no apprehension that the concessions will increase during the period for which the plan has been framed. The plan provides for the satisfaction of the concessions on the existing scale, and if the Local Government, in sanctioning it, would fix the extent of the grant at the average of the last five years, the objection would be removed so far as the conservative management of the forests is concerned, and, as officer criticising the working plan laid before me, I have no concern with the financial aspect of the question.

2. Mr. Fernandez entirely agrees with me in my proposals, made in paragraph 4 of the letter above quoted, regarding the periodical closing of larger areas against grazing than that originally suggested by him.

No. 584.

Copy forwarded, for information, to the Conservator of Forests, Central Circle, North-Western Provinces and Oudh, in continuation of endorsement No. 407, dated the 16th ultimo.

No. $\frac{417F.}{667\text{-}4}$, dated Naini Tal, the 20th August, 1887.

From—H. V. Lovett, Esq., C. S., *Under Secy. to Govt., N.-W. P. and Oudh, in the Rev. (Forest) Dept.,*

To—The Commissioner of the Kumaun Division.

Sir,—I am directed to forward the working plan of the Ránikhet forests together with the correspondence marginally noted, and to request that you will, after consulting the Conservator of Forests, Central Circle, submit your opinion on the following points :—

1. Whether the future annual grant of standing timber to privileged villagers should be definitely limited to the average grant during the past five years, *i. e.*, to 3,579 trees (see page 22 of the working plan) and (2) whether any portion of the protected area might, with the object of encouraging reproduction, be closed for a term of years under section 29 (*b*) of the Indian Forest Act, with due regard to the actual grazing and other requirements of the privileged villages.

2. I am to request the return of the working plan and correspondence with your reply.

No. $\frac{2106}{\text{XXIII.-68}}$, dated Naini Tal, the 29th August, 1887.

From—H. G. Ross, Esq., C.S., *Commissioner of the Kumaun Division,*

To—The Conservator of Forests, Central Circle, N.-W. Provinces and Oudh.

Sir,—With reference to the working plan for Ránikhet, and the Government orders thereon, herewith sent in original for perusal and return, I would feel obliged by your kindly letting me know whether you have any proposals or suggestions to make.

2. If you have, and could send them to me in writing, I could go over them, make such enquiries as might be necessary, and then we could meet and discuss the matter.

No. 489, dated Haldwáni, the 19th December, 1887.

From—C. Bagshawe, Esq., *Offg. Conr. of Forests, Central Circle, N.-W. P. & Oudh,*

To—The Commissioner of the Kumaun Division.

Sir,—With reference to your No. $\frac{2106}{23\text{-}68}$, dated 29th August, 1887, and G. O. No. $\frac{4171.}{667\text{-}4}$, dated 20th August, 1887, and enclosures (all herewith returned), I have the honor to inform you that I have, since receiving the above, been able to make a second inspection of the forests and also have obtained a checked list of the actual head of cattle grazing therein. I now beg to proffer the following suggestions.

2. With reference to the proposed limitation of the villagers annual right to timber to the average of the past five years, *viz.*, per annum :—

	1st and 2nd class	3rd class.	Total.
Chir	428	2,738	3,166
Oak	..	392	392
Other trees	1	20	21
Total ...	429	3,150	3,579

I am of opinion that this restriction will neither cause hardship or be a breach of faith. The record of grants shows that the excessive demand made some years back has steadily decreased, while it is known the past five years have included special demands for timber to build additional cattle-sheds in consequence of the cattle disease rendering it necessary to keep cattle away from dwelling houses. I think, however, the further reservation should be made that if in any protected forest on which a village holds a right to timber there are not poles in sufficient numbers to justify *thinning operations*, larger trees of equal volume will be given in the forest in which the right is held, to be converted by saw, or, at the option of the village, poles will be allotted in the nearest protected forest where poles are available.

This reservation is absolutely necessary as in some forests the number of poles must, if cutting is continued, shortly be brought below the normal minimum, and therefore to continue cutting will ruin the forest. Putting the reservation in the way I have, will, I think, cause the minimum of hardship to the village which will have the option of sawing timber or getting poles elsewhere.

3. With reference to grazing and the proposals to close one-eighth or one-fourth of the area of each block of protected forest in the working circle, the Ránikhet forests may be grouped as follows (*vide* detailed list attached), *viz.* :—

I.—Forests in the working circle and near the Ránikhet Cantonments.

Number of Forests.	Area acres.	Maximum head of cattle under right.	Actual head grazed, 1887.
5	4,490	18,894	7,541

II.—Forests in the working circle but not affected by the Cantonment.

Number of Forests.	Area acres.	Maximum head of cattle under right.	Actual head grazed, 1887.
4	7,874	19,545	6,878

III.—Forests not in the working circle but which supply Ránikhet with charcoal, &c ,

Number of Forests.	Area Acres.	Maximum head of cattle under right.	Actual head grazed, 1887.
2	6,400	10,131	4,323

The acreage of grazing per head in these three groups contrast as follows :—

		Actual head acreage.	Contemplated minimum acreage.
1.	...	·60	·24
2.	...	1·14	·40
3.	...	1·48	·63

With reference to the small minimum acreage contemplated by the Forest Settlement Officer and after reference to Government duly sanctioned, it should be noted that really (save for a very small percentage) the grazing is for half a year only, as the cattle go to the submontane grazing lands for the autumn, winter, and spring.

There is no doubt that if Government is to provide timber and grazing, &c., for the villagers with the necessary margin for fuel for the troops, that a part of the forest must be closed in rotation.

Considering the class of the grazing in group I., I do not think it possible to close over one-eighth of the area. In groups II. and III. I see no reason why one-fourth should not be closed.

The villagers should have, as they have in the existing closed blocks, the first right to fodder grass. The value of this fodder is now fully appreciated by the villagers and the amount of grass stored by them annually is large.

The effect of closing the areas suggested would be to give the following average acreage of grazing in each group.

Number.

I.— ·53 opposed to Forest Settlement Officer's minimum ... ... ·24
II.— ·86 Ditto ditto ... ... ·40
III.—1·11 Ditto ditto ... ... ·63

or in each case nearly double the minimum sanctioned by Government. By not insisting on the closed blocks in each forest being in one locality, I am sure the areas suggested could be closed without detriment to the villagers, and I would recommend a scheme on these lines being sanctioned by Government.

Forest in working circle near the Cantonment of Ránikhet.

	Area acres.	Maximum head of cattle allowed under register of rights.	Actuals head counted, 1887.	Average area in acres grazing per actual head of cattle.	Average area in acres contemplated at time of settlement per maximum head of cattle.
Chaubattia east and west ...	1,204	5,086	2,097	...	...
Dwarsaun	1,514	5,474	2,381	...	...
Padoli	944	5,476	1,287	...	...
Chiliánau	612	1,858	1,043	...	...
Karchuli	216	1,000	733	...	...
Total ...	4,490	18,894	7,541	·6	·24

Forests in working circle unaffected by Contonment of Ránikhet.

Siuni	4,425	11,957	3,540	...	...
Siun	727	1,900	524	...	...
Kathalekh	1,813	3,930	2,085	...	...
Ganiádioli	909	1,758	729	...	...
Total ...	7,874	19,545	6,878	1·14	·4

Forests not in working circle but which must be worked to supply Ránikhet with charcoal.

Bhatrong	5,760	6,695	2,866	...	...
Bellekh	640	3,436	1,457	...	...
Total ...	6,400	10,131	4,323	1·48	·63

No. $\frac{1134}{\text{XXIII-97}}$, dated the 26th March, 1888.

From—H. G. Ross, Esq., *Commissioner of the Kumaun Division,*

To—*The Secy. to Government, N-W. Provinces and Oudh, Revenue (Forest) Dept.*

Sir,—I have the honour to acknowledge your No. $\frac{417F.}{667\text{-}4}$, dated 20th August last, and enclosures, regarding the working plan of Ránikhet forests.

2. There is no objection to taking the average of last five years as the maximum quantity of wood to be supplied in five years to right-holders in the Ránikhet forests; no hardship will arise from it.

3. There is, so far as I can see, no reason why certain portions of the forests should not be closed in rotation; but I think it will be better to settle this matter in detail when distinct proposals are made, stating clearly the portions it is proposed to close.

4 It will be necessary not only in the interests of Government, but also in the interests of the villagers, to add a clause that when it is found impossible with due regard to the proper protection of the forests, to give poles to villages from the forests near to them, an equivalent will be given in big trees to be sawn up, or poles will be given from some adjacent forest.

No. $\frac{241F.}{667\text{-}8}$ OF 1888.

RESOLUTION.

REVENUE (FORESTS) DEPARTMENT.

Dated Naini Tal, the 5th May, 1888.

READ the undermentioned papers :—

1.—Working plan of the Ránikhet working circle.

2.—Letter from the Officiating Inspector-General of Forests to the Government of India, No. 406, dated 16th June, 1887, and enclosures.

3.—Letter from the Officiating Inspector-General of Forests, to the Government of India, No. 583, dated 30th July, 1887.

RESOLUTION.—The Lieutenant-Governor and Chief Commissioner is pleased to sanction the working plan for the Ránikhet forests in the Central Circle, on the understanding—

(1) that the requirements of the adjoining villages are met on the basis of the average of the last five years ;

(2) that closure against grazing be gradually extended to one-eighth of the area in each forest, the areas closed being in each case as compact as possible.

By order, &c.,

J. WOODBURN,

Chief Secy. to Govt., N.-W. P. and Oudh.

No. $\frac{242F.}{667\text{-}9}$.

COPY forwarded to the Inspector-General of Forests, for information.

No. $\frac{243F.}{667\text{-}10}$.

Copy also forwarded to the Conservator of Forests, Central Circle, for information and guidance, with the request that 100 copies of the plan—to which a copy of the above Resolution should be appended—be printed, and that 50 copies be forwarded to this office for distribution to the Government of India and other Local Governments and Administrations, the remaining copies being distributed by the Conservator, Central Circle, to other Conservators, as directed in Circular No. 3F. of 1886 from the Government of India in the Home (Forests) Department.

No. $\frac{244F.}{667\text{-}11}$.

Copy also forwarded to the Commissioner, Kumaun Division, for information, with reference to correspondence ending with his letter No. $\frac{1134}{XXIII-97}$, dated 26th March, 1888.

By order, &c.,

W. H. L. IMPEY,

Under-Secy. to Govt., N.-W. P. and Oudh.